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A STUDY OF
THE PAST, THE PRESENT AND THE
POSSIBILITIES

OF

THE HEMP INDUSTRY
IN KENTUCKY.

BY

BRENT MOORE, A. M.

SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS
FOR THE DEGREE OF DOCTOR OF PHILOSOPHY
IN THE
FACULTY OF POLITICAL SCIENCE IN
COLUMBIA UNIVERSITY.

1905
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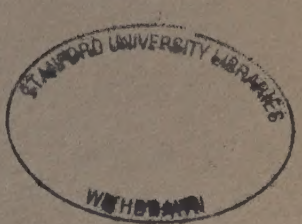

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INTRODUCTION.

A Brief Sketch of Hemp in England, and Colonial Virginia.

Inasmuch as the history of hemp in England bears only very slightly on our subject proper, we shall pass over it rapidly, confining ourselves as to prices largely to quoting some figures contained in the monumental work of Thorold Rogers.

Rogers begins only with the thirteenth century. Mongez[1] says that hemp cloth is first mentioned in England about the middle of the twelfth century; but this does not necessarily mean that hemp cloth was not made there long before. Rogers thinks that hemp cloth of all grades was made throughout England in the households from the earliest times until late in the eighteenth century. "Now there always were textile industries in England. There was probably hardly a home without a spinning wheel, hardly a manor without half a dozen hand-looms * * * These domestic industries were general, at least to the middle of the eighteenth century."[2]

Up to the time of the Black Death flax seems to have been practically unknown in England, although the use of hemp was wellnigh universal. As we approach modern times, we find increasingly frequent mention of flax; but before flax became well known the rise of foreign trade gradually drove out the production and manufacture of both hemp and flax, Russia furnishing the raw material and coarser goods, while Ireland and the Netherlands furnished the finer, much as to-day.

Rogers has given us prices of hemp and hemp goods in great abundance, but it is difficult to make very much out of them.

[1] Citoyen Mongez, *Recherches sur l'emploi du chanvre dans l'antiquite et dans le moyen age.* Paris, in the year XII.

[2] Rogers, *Economic Interpretation of History,* p. 281.

The prices vary so widely, both in time and place, the systems of accounting and the units of measurement vary with different manors, and the purchasing power of money ranges so widely, that it would be pratically impossible to unravel the snarl. If we had frequent figures showing the rent of land, or wages of farm hands, we might be able to compare these prices with those of to-day; but, unfortunately we do not possess figures sufficiently definite respecting these elements of cost. Up to the Black Death, hemp ranged from a half-penny to three farthings a pound, which Rogers makes equal to £4 13s. 4d. to £7 a ton, in modern English money, or about $22 to $34 a ton. He does not say whether it was the long or short ton; moreover, we know well that no one could raise hemp at such prices. Rope, during this time, seldom swerved from the steady price of a penny a pound, and coarse hemp cloth ranged from a shilling to 18d.[1]

Bagging averaged two and a half pence a yard, and hemp seed fluctuated from twelve to fifteen shillings a quarter down to two shillings, at which price it was fed to the pigs. Hemp-breaking is put down twice, being paid for at three pence a petra in 1341, and five pence a perta in the year 1344. Land rent seems to have run about six pence an acre, the quality not given. Plantation or manorial farming being the rule throughout this time, money rents or wages were probably unusual until after the Black Death.

The Plague brought about a revolution in the general level of prices, and the endless wars must also have greatly disturbed prices, so that quotations of them mean little to us. Hemp is quoted in two grades, "large," and "small;"[1] and as the grade is not always specified, this would again disturb any calculations in terms of modern prices. It will suffice to say that the nominal prices of hemp and hemp goods increase, on the whole, as we come down through the ages, although we can say little of the

[1]J. E. T. Rogers, *History of Agriculture and Prices in England*, p. 281.

real prices, owing to the great number of considerations that must enter into every calculation.

It is not until the beginning of the sixteenth century that the materials composing the various canvas and linen goods begin to be specified.[1] After that we find frequent mention of "hempen cloth," "hempen table cloth," "hempen," "hempen towels," and so forth.

Untold varieties of canvas are mentioned, being used for windmills and ship sails, for fine napkins, sheets and altar cloths, meal bags, and horse blankets, flags, cartridges, and so forth. If one is right in thinking that all canvas was originally made of hemp, then the use of this fiber was almost universal in England. Roger says that hemp seed was "extensively and compulsory cultivated, under the penalty of fine in case of neglect." Henry VIII compelled the cultivation of hemp, its extinction probably being threatened by some cause.

The general prosperity of Elizabeth's reign, the rise of British shipping, and, probably, the comparative neglect of agriculture made the home supply of hemp more and more inadequate, until the distress from this source seems to have been keen.

In 1585 Heriot[2] spoke of a wild hemp or silk grass growing in Virginia, and pointed out to England the possibility of an abundant supply of hemp from there. This suggestion seems to have been acted on later by the Virginia Company, who required that one of the "commodities which these people are directed principally to apply (next their own necessary maintenance)" should be "cordage, for which, besides hemp and flax, directions is given for planting of silk grass naturally growing in those parts in great abundance, which is approved to make the best cordage in the world. Of this every household is bound to set 100 plants, and the Governor himself to set 5,000." In the Proceedings of the Company for 1620 is entered:

[1] *Calendar of State Papers,* Colonial.
[2] Heriot, *Narrative of the First Plantations in Virginia,* p. 10.

Touching Gabriel Wisher's offer at the last court to procure out of Swedeland and Poland, men skilful in making pitch and tar, soapashes and potashes, dressers of hemp and flax, etc., at the rate of £10 10s a man, that shall be there by the end of May next, the court hath ordered that he shall have £100 allowed him to provide ten skilful men as aforesaid.

Sir William Berkley also announced to the Lords in Council[1] that he was to start for Virginia

To promote those staple commodities of silk, hemp, flax, etc., which Virginia is so admirably adapted to produce, that within seven years England will not be necessitated to bring them from other countries. For this some few skilful men are wanted to teach the newest and cheapest way to produce such commodities for which £500 once expanded will be sufficient.

In 1649 a writer[2] says: "They begin to plant much Hempe and Flax which they find growes well and good, onely hands are wanting to this and other good workes." One planter, "Worthy Captaine Matthews," is said to have "a fine house and all things answerable to it; he sowes yearly store of Hempe and Flax, and causes it to be spun." This worthy seems to have been a model of thrift, and "in a word, keeps a good house, lives bravely, and a true lover of Virginia." Had there been more like him, the history of hemp in Virginia would have in it more of economics and less of politics.

Beverly says[3] that in 1663 severer restrictions were laid on the Virginia trade, and

For this their Assembly could think of no remedy but to be even with the merchants, and make their tobacco scarce by prohibiting the planting of it for one year; and during that idle year to invite the people to enter upon manufacturing hemp and flax. But Maryland not concurring in this project, they were obliged in their own defence to repeal the Act of Assembly again, and return to their old drudgery of planting Tobacco without profiting by it.

[1] *Calendar of State Papers, Colonial, for America & W. Indies.*
[2] *Perfect Description of Virginia* in *Force Tracts.*
[3] Beverly, *History of Virginia,* p. 59.

In 1665 we find an entry:

Touching the petition of Nic Wilde, merchant, desiring liberty to import certain Persia goat's hair, red wool and hemp; conceive that hemp is so useful that it may well be dispensed with to be brought from any parts, but for the hair and wool are not satisfied of any cause to dispense with the Act[1]

Beverly says of the Virginians:[2]

They have their clothing of all sorts from England, as linen, silk, hats and leather; yet flax and hemp grow nowhere in the world better than there * * * In fine, if any one impartially considers all the advantages of this country as Nature made it; he must allow it to be as fine a place as any in the Universe; but I am ashamed to say anything of its improvements, because I must at the same time reproach my Countrymen with unpardonable Sloth. If there be any excuse for them in this matter, 'tis the exceeding plenty of good things, with which nature has blest them; for where God Almighty is so merciful as to give plenty and ease, people easily forget their duty * * * Nay they are such abominable Illhusbands that though their country be overrun with wood, yet they have all their wooden ware from England.

Hugh Jones says:[3]

I can not here omit mentioning a late design of seating all convicts that should be imported into Virginia, in a county by themselves, under the care of proper overseers, who should confine them from doing any hurt, and keep them to their labor by such methods as are used in Bridewell. The land intended for this new county is very good, and fit to produce hemp and flax, which they were there solely to cultivate and manufacture; from whence the county was designed to be called Hempshire. Though the project was never put into execution, yet I am of the opinion that something of this nature would be very advantageous in securing and employing our felons, and for our better supply of cordage in our naval stores, and making of linen of all sorts * * * More might be said of the manufactures of hemp and flax, than what I have mentioned of wool, because we are in a great measure obliged for

[1]*Calendar State Papers,* Colonial.
[2]*History of Virginia,* p. 59.
[3]*Present State of Virginia,* p. 122.

these to foreign nations, who in case of war, might pinch us more prodigiously than they do; more particularly to the great expence and inconveniency of our shipping, the glory and bulwark of the British nations. Here we have good land lying waste and at Home we have people lying idle sufficient to supply us with ropes, cables, and canvas for our ships of war and merchandise, and linens for weaving and for household use, were projects set on foot and rightly carried on for so useful and advantageous undertakings.

Washington stated in his letters to Arthur Young, that hemp was then selling for five pence a pound, and that a Negro man could be hired for £9 a year. He says of the Negroes:

Blacks are capable of much labor, but having, (I am speaking generally) no ambition to establish a good name, they are too regardless of a bad one, and of course require more of the master's eye * * * Much hemp might be raised in these countries were there the proper encouragement—the foreign hemp gluts the market, and there is not a sufficient protecting duty to spur the farmer to raise this useful article. Our hemp lands would average a 700 weight to the acre (that is what is called broken hemp), * * * Rich, fresh bottom, yields 500 or 600, and highly manured land 6, 8, or 900 pounds to the acre; the cultivation of it has almost ceased.

The Statutes of the Assembly of Virginia touch on this subject throughout its entire history, from 1619 to 1780. Some of the more important provisions are found in Hening,[1] vols. 1, ch. 218; ii. ch. 306; iii, 81; iv, 96 and 293; v. 357; vi. 144; viii. 253; x. 245 and 481; and vol. xi, ch. 76, 99, and 412. Their purport in general is that as a preparation for war the county courts should distribute a quart of flax seed and a quart of hemp seed to each tithable, who is bound to deliver every year one pound each of dressed hemp and flax, or two pounds of either, to the tithing master, under oath that it was of his own growth. The acts graudally grew milder in tone, and then tried coaxing. The bounties applied, at first, only to dressed hemp "water-rotted, dry bright and clean." Later acts added a further bounty for hemp actually shipped to England, and also bounties on home-grown and home-woven linen cloth of flax or hemp. Col. William

[1]Hening, *Statutes of Virginia.*

Byrd of Westover is found among those who received bounties under this ruling.

With all this fostering care, however, the hemp industry seems never to have taken firm root, probably because governmental tampering gave it unpleasant associations in the hearts of the Virginians.

CHAPTER I.

A History of Hemp in Kentucky, in all its Branches

The social and economic ground in which the hemp industry took root was or virgin freshness. The society had been sown with clean seed upon clean soil under a sun which was then particularly favorable to the growth of high ideals. None but free-spirited, clean-hearted, sturdy men and women would or could have run that gauntlet through the wilderness into a country claimed by the greatest powers of Europe, and then driven out the savages, who were in possession. The prize was surely worth the winning; and in the flush of its conquest, the pioneers became convinced that everything was possible to them. The economic conquest alone remained, and to this task they set themeselves with hearts full of hope and strength.

Pioneer life tends to make resourceful men, sharpening their wits, and rounding out soul and body. Having deliberately cut themselves off from the world, our pioneers were to have nothing but what they could make for themselves. Shut off utterly from trade, but with unbounded resources in and about them, they set to work without thought of fail. Having no capital, they fed directly from the hand of nature while they were accumulating stock and tools for the future. Work tended to cleave along the line of sex, just as in the days "when Adam delved and Eve span." The women upheld all there was of the finer manufactures until agriculture outran them and enabled the men to take hold.

It is now one hundred and thirty years since Archibald McNeil first raised his crop of hemp seed near Danville.[1] Next comes a gap of several years, in which no mention of hemp is found, but in which the beginning of trade with the Spaniards

[1]Collins, *History of Kentucky.*

were made. Until then there was practically no money in the country, a thousand dollars in Virginia paper being worth only one dollar in silver.[1] Accordingly, even the home trade was carried on mainly by barter, in which hemp, as the result of its comparative uniformity, its comparative freedom from deterioration, the universal and steady demand for it, and its value, which exceeded all other raw produce, was recognized as the standard commodity for the first three or four decades.

For some years trade notes are scarce, but some commerce with New Orleans seems to have been carried on very early. In 1782 Jacob Yoder took a cargo of floor to New Orleans, and after some further trading there, returned to his home at Bardstown.[2] Filson, writing in 1784, mentions hemp but once,[3] and then only incidentally. Speaking of the soil and produce of Kentucky, he says:

> The soil is very favorable to flax and hemp. From New Orleans to the Falls of Ohio, batteaux, carrying about forty tons, have been rowed by eighteen or twenty men in eight or ten weeks, which at the extent, will not amount to five hundred pounds expence, which experience has proved to be about one-third of that from Philadelphia * * * Now we know by experience that forty tons of goods cannot be taken to the Falls of Ohio, from Philadelphia under sixteen pounds expence; but by improvements on the Mississippi, with the convenience of these boats, goods can be brought from New Orleans to the Falls for the tenth part of that expence.

The boats, of whose "conveniences" he speaks, are described as the "newly invented mechanical boat, it being their peculiar property to sail best in smart currents," and which he says were invented by James Rumsey and McCraken. He also says:[3] "By stating the commerce of Kentucky in its proper terms, we find the expences such that we conclude with propriety that the country will be supplied with goods as cheap as if situated only forty miles from Philadelphia."

[1]Imlay's *Western Country.*
[2]J. M. Brown, *Political Beginnings of Kentucky,* p. 23.
[3]Filson, *History of Kentucky,* pp. 14, 28.

In 1787[1] Gen. Wilkinson took a fleet of boats loaded with tobacco to New Orleans. New Orleans was not, at that time, open to our produce; but the Spanish intendant was so impressed with the personality of Wilkinson, that an exception was made in his favor, and Wilkinson not only sold his tobacco well, but thereafter carried tobacco for others on a commission of two-thirds of the proceeds above fifteen shillings a hundredweight, with a freight charge of four shillings a hundredweight from Louisville, or six shillings from Frankfort to New Orleans.

For some years to follow, we hear nothing more of our subject; but in the *Kentucky Gazette* of August 18, 1787 is an article signed, "A Friend to Kentucky," which gives us an insight into social conditions. The ideal of the writer was undoubtedly full economic and political freedom for Kentucky. He makes an earnest plea for simplicity in taste, and for patience until home manufactures could meet all our needs. He says:

> The importance of the present period calls aloud for the attention of every man of reflection, who has the interest of our rising republic at heart. It becomes the duty of every citizen to step forward and contribute his proportion in establishing the foundation of our Infant Country upon the firmest principles of national honor. Upon this basis let us fix our future hope of happiness and prosperity, for from this source alone can we expect to derive those blessings for which Government is instituted. As in private life, so in society will our future conduct receive its bias from the customs and habits with which we commence our political existence.
>
> While the wisdom of our patriots is engaged in constructing a form of government best adapted to our situation and circumstances let me call your attention to objects altho not so abstruse, yet in their consequences equally important.
>
> Removed at a distance from the ocean we must rely upon our industry for those manufactures which we were accustomed to import from foreign countries * * * It is evidently our interest to encourage the manufacturing of those materials which our country produces, and such form the most essential part of our consumption; there is no spot on earth better calculated for home manufacturing, nor is there any that can receive more advantage from it.

[1] *Political Beginnings of Kentucky.*

The Good consequences that would follow are almost innumerable; it would give a spurr to industry, which at present languishes for want of objects toward which it can be directed; it would afford an honest and independent subsistance to thousands of valuable citizens, whose services are at present lost to society, it would induce artists to emigrate from our sister states, and with them we receive the most valuable acquisition any state can obtain * * * We are panting with an uncommon ardor for an intercourse with the world, thro the river Mississippi, and seem to anticipate the period when we shall stand high in the ranks of Commercial Nations * * * When the happy period arrives that we shall possess the free navigation of the western waters, we must use them for the purpose which nature hath designed them; let them minister to our happiness and not to our misery; let us consider them as vehicles which we are furnished with, to supply the world with the fruits of industry, and receive in recompense property equal in intrinsic value, and not gew gaws, better calculated for our neighbors the savages. Let the importance of home manufactures be imprinted on our minds, let us not suffer ourselves to be the slaves of fanciful enjoyments, and neglect those things which would contribute to the wealth of individuals and the happiness of society.

Two months later, Abigail Trueheart, writing "To the Good Women of Kentucky," begs them to be brave and cheerful in their new home, and not to long for the frivolities of their early surroundings. She quotes the argument that the strength of a nation consists in the *number,* the *uprightness* and the *industry* of its citizens, and not in its wealth, which is often its danger.

Here my female friends, we are taught that what is praiseworthy in other countries, becomes an indispensible duty in this. Shall we not be as comfortable and lovely clothed in homespun as in foreign lace and brocade? And shall we not in this way effectually secure the independence of our families and our country? * * * Would to God we had also left behind our fondness for the gaiety of dress, the parade of grandeur, and the fashionable amusements of a dissipated age. These are like to be the bane of our infant community, and the destruction of our fortunes * * * I have always heard that a country could not flourish without the advantages of trade; and when I found that this country is so situated as to have but slendor prospects of gain in this way, I was grieved and ready to despond, on account of what seemed so great a misfortune. But now I am perfectly reconciled by the reflection that, though great

wealth cannot be amassed, yet by frugality and industry a competency will certainly be obtained; and that this plain way of living will be a security for the virtue of my children, which is of more value than great riches.

In the same issue[1] "A farm in good order for raising corn, hemp, flax and tobacco" is advertised for rent. Advertisements of hemp seed are also found during the spring of 1788.

Imlay thought very highly of Kentucky's outlook at this time,[2] calling it "the keystone of the settlements upon the waters of the Mississippi." He adds:

During these times of barbarous war and massacre, the people of Kentucky and Cumberland, secured by their numbers and strength, except in their outermost plantations, enjoyed perfect security. The former continued to keep in view the object of her independence; and from the respectable figure she has made in the administration of her affairs, it is at length agreed, that she is to be admitted into the federal union in June 1792.[2]

In the Gazette[1] of December 13, 1788, occurs a note of Fitch's steamboat, which he had run successfully on the town branch at Lexington. The idea of the steamboat had first occurred to Fitch while sitting upon the banks of the Ohio in 1780;[3] and he built his first model at Bardstown, his home. The heavy current on the Mississippi, which was so mighty a factor in our foreign trade, was the necessity which produced the invention of the steamboat, though the exact inventor is still unknown. Whether or not the "mechanical boats" of which Filson speaks were run by steam, we do not know. Bishop says[4] that it was Edward West who made the first working model of a steamboat, which he ran upon a river in Kentucky.

On December 27, 1788, the editor of the Gazette offers to take hackled hemp in payment for his paper, at the selling price in Lexington. During the spring of 1789 Tippoo Saib, a race

[1] *Kentucky Gazette.*
[2] Imlay, *Western Country,* pp. 16 and 22.
[3] *Biographical Dictionary of Kentucky.*
[4] *History of American Manufactures.*

horse, makes the season for thirty shillings cash, or forty shillings in tobacco, pork, hemp or butter. Merchants offer to exchange their goods for various country produce, hemp being especially mentioned. Country linen is also added to the list very soon.

During the fall of 1789 the Kentucky Society for the Encouragement of Manufactures are called to meet next at Danville.[1]

On March 22, 1790 appears the following: "Wanted, a quantity of hemp in a short time, for which twenty-five shillings a hundred will be given, if delivered at Frankfort, or twenty-three shillings if delivered at Lexington."[1]

On July 22, 1790[1]

John Hamilton, rope maker, respectfully informs the public, that he has erected a ropewalk at Mr. Frank Dill's, about two miles from Lexington, where he carries on the rope making business. Any gentleman may be furnished with any kind of cordage (except tarred) or twine on the most reasonable terms. He flatters himself, that from his skill in the art, and attention to business together with the quantity of his manufacture, will sufficiently recommend him to the attention of the public.

On January 15, 1791 was: "Wanted a quantity of hemp, for which twenty shillings a hundredweight will be given in goods by Peter January and Son."[1]

On May 5, 1792[1] "The Sloop Western Experiment, Captain Charles Nicholson, built on the Monongahela and bound for Philadelphia—passed Limestone Saturday the 20 of April."

On June 2, 1792, was "Wanted to employ a sober, industrious man who is capable of conducting a Coarse Linen Manufactory."

On February 16, 1793,

The subscriber informs his friends and the public, that his hemp mill lately built, is now in complete order and ready to take in hemp for the purpose of milling the same; to be well done and fit

[1]*Kentucky Gazette.*

for the hackle for one eighth part of the quantity brought to mill. One bed is 120 pounds, and can be delivered in one hour and a half after the same is put in; one wagon load can be done in two days. Those who favor the said mill with their custom, will find their business executed with care and dispatch by Eli Cleveland. N. B. Hemp not to be brought twisted.

On June 8, 1793, "Irwin and Bryson, at their store in Lexington, will purchase all the clean good hemp that may be brought to them."[1]

On January 25, 1794[1] was, "Wanted immediately a number of men to conduct boats to the city of New Orleans, for which generous wages will be given by Elisha Winters and Co." Winters also advertises his ropewalks on Tate's Creek.

In the spring of 1794,[1] Union, a racehorse, makes the seoson for thirty shillings, or "two hundredweight of merchantable hemp." On June 14, 1794 "A quantity of well cleaned hemp is wanted by the subscriber at his Store in Lexington, for which twenty-three shillings per hundreweight will be given in Cash and Merchandise. He will also receive Linen and Hemp in discharge of book accounts."

On March 21, 1795[1] a farm of 300 acres, near Lexington, was offered for sale, having on it "a good hemp mill."

Also on July 11, 1795 "The subscriber, having begun manufacturing Cordage, wants a quantity of well Cleaned Hemp * * * A Few Journeymen Rope Makers will meet with encouragement by applying as above to Thomas Hart."[1]

On April 9, 1796[1] appears a "Scheme of a Lottery for raising the sum of Ten Thousand Dollars for the purpose of erecting a Duck and Linen Manufactory in Georgetown."

April 16, 1796, G. Beatty advertises,[1] "I will give a generous price in Cash or Merchandize, for all the good clean Hemp, delivered either to me or to Otho Beatty & Co., in Frankfort, from this time until the first of May ensuing."[1]

On November 26, 1796[1] "The Subscriber will engage a number of Able Bodied Men to conduct their boats to New

[1]*Kentucky Gazette.*

Orleans. Liberal wages will be given. Apply to Seitz and Lauman, Lexington. A generous price will be given for clean Wheat, Hemp, and Tallow in Merchandise." Robert and Andrew Porter, Sam Price and others also advertise for "Country produce suitable for the New Orleans Market." It will be remembered that on October 27, 1795 Spain had opened the Mississippi to the people of the United States and England for trade, hemp and hemp goods being especially mentioned among the articles which were to pass freely.

On March 22, 1797[1] appears the following:

The subscriber having engaged a workman from Philadelphia, perfectly acquainted with manufacturing cordage in all its different branches, is determined to engage extensively in that business; he will therefore give the highest prices for good well cleaned hemp and tar and generous wages to all such journeymen rope makers as can come well recommended for their sobriety and industry. Cash will also be given for a quantity of hemp seed of last year's growth.

In the issue of Nov. 5, 1797[1] "The Monitor," writing on the industrial development of Kentucky, divides this growth into three periods. In the first period trade was carried on mainly by barter; there were no imports or exports.

Therefore, although the means of the inhabitants were small, yet as they were equal to, or rather exceeded their wants, the community at large was in a prosperous state, and it was during this time that the foundation was laid of that uncommon degree of improvement which has since astonished all who have visited this country.

He goes on to say, that during this period, owing to a fertile soil and sturdy settlers, goods had accumulated, and foreign markets were much wanted. The Indian wars coming on then offered a good market for our surplus good and personal services, and thus brought in the second period. The second was the period of greatest immigration, the immigrants being largely of wealthy men,

[1]*Kentucky Gazette.*

Who were not generally considered as the most industrious or economical part of the people in the countries they came from; and instead of laying aside old follies on their removal, they too often relied on the practice of them, with some additional ones to give them consequence in a strange country.

The third period, he says, was marked by the trade with the Spanish countries, and the consequent extravagance and shame of home industries. Of the first period The Monitor says, "The contest *then* was, who should excel most in domestic manufactures of every kind; and the luxuries of that day were the articles which were produced by a superior degree of domestic industry and skill."

On December 6, 1797, "The Monitor" discusses the crops best suited for export. He says, "I believe it will be unnecessary to perplex ourselves with deliberating between a great number of articles. If we can properly decide between wheat, tobacco and hemp, it will be sufficient for our purpose." After a discussion of these, he decides for hemp, since we could have no fear of competition in this article from the other states; besides which, hemp, of all crops, represented the most money for its weight, this being a great advantage in shipping. "This, then, will leave us but one more question to decide on, when the hemp is made—Ought we to export it in its raw state or ought we first to manufacture it?" Freight rates easily answered this question in favor of manufacturing. He says that during the two years before the war with France, hemp was £65 a ton in Philadelphia, while cordage was £110 a ton, and duck much higher. He said that the greater part of the work of hemp manufacture could be done by Negroes, while food was cheaper in Kentucky than any where else in America; that no attempt had been made to make duck here, and that "It will be a subject very proper for inquiry, whether the last legislature acted wisely when they refused to lend the public aid, to enable a citizen to carry on the business of manufacturing duck." He puts the freight to Philadelphia at £25 a ton.

On May 3, 1798,

The subscribers being about to open a rope walk on the north bank of the Kentucky river about one mile above Frankfort, wish to purchase about twenty tons of hemp, delivered at any of the inspections on said river, for which they will give twenty-six shillings to be payed in cash in three months. We also wish to hire a number of boys or young men, black and white, to assist in the walks at Georgetown and near Frankfort, to whom generous wages will be given, their board and washing found while they may learn a valuable trade. Elijah Craig and Son.

On June 20, 1798, Samuel Wilkinson, "a Whitesmith," announces that he is well acquainted with the making of "cotton or flax machinery, rope walks, and so forth."

On May 9, 1799, is offered "For sale a quantity of clean hemp seed of the last years growth, for one dollar per bushel."

On November 10, 1800, "Prices Current" gives bale rope at $16.00 per French hundredweight at New Orleans; Country linen at 27 @ 60 cents a yard; Insurance to the Atlantic States 10 and 12 per cent. Freight on hemp, $3.00 @ $4.00 a hundredweight.

Advertisements during the year 1800 show that land was sold for "Cash or Hemp," and several firms offered to settle in "Hemp, wheat, flour or tobacco," to avoid suits for debt.

Dr. Michaux, who came through Kentucky about this time, said of Lexington:

The wages of labor are here more liberal than in almost any part of America. A laborer earns a piaster or dollar a day, and may live on one day's wages a whole week * * * The women seldom interfere in the labors of the field; they remain at home, assiduously engaged with the cares of the house, or employed in spinning hemp or cotton, which they afterwards make into cloth for the use of the family. This work alone is considerable, for there are few houses in which there are not four or five children.

He said that the freight from Philadelphia and Baltimore to Lexington was seven or eight dollars a quintal. [1]

On March 2, 1801 [2] an executor for some estate advertises

[1] Michaux, *Travels in North America.*
[2] *Kentucky Gazette.*

servants to hire, among whom one is recommended as "a good weaver" and another as "a good spinstress."

March 30, 1801[1] were

For sale, three or four boats, 45 by 14 feet, to be built in the strongest and best manner, and delivered at Boonsborough, at any time when required, after ten days previous notice, for which hemp or good horses, will be received in payment by Thomas Hart. Also a quantity of cable rope may be had at the same place, by applying to Maj. Jno. Wilkinson.

The younger Michaux,[2] who came through in 1802, says something of the trade in those days. He states that New Geneva, in Pennsylvania, was "famous for building large boats, called *Kentucky Boats,* used in the Kentucky trade; numbers are also built at Elizabeth Town, situated on the same river, about twenty-three miles from Pittsburg—the "*Monongahela Farmer*" was launched there, a sailing vessel of two hundred tons." He says of Kentucky:

The want of hands excites the industry of the inhabitants of this country. When I was at Lexington one of them had just obtained a patent for a nail machine, more complete and expeditious than the one made use of in the prisons of New York and Philadelphia; and a second announced one for the grinding and cleaning of hemp and sawing wood and stones. This machine, moved by a horse or a current of water, is capable, according to what the inventor said, to break and clean eight thousand weight of hemp per day.

He says of Lexington, "Two extensive rope walks constantly in employ, supply the ships with rigging that are built on the Ohio," Warden of Scotland,[3] speaks of "The Kentucky boats, built of an oblong form, from twenty to fifty feet in length, and from ten to fourteen in breadth, with an arched roof,

[1] *Kentucky Gazette.*

[2] F. A. Michaux, *Travels to the West of the Alleghanies,* p. 80, 152.

[3] D. B. Warden, *Social and Statistical Account of the United States of America.*

or deck, supported by strong sides, six or seven feet in heighth. They cost $1.00 to $1.50 a foot in length."

On February 18, 1802[1] sixty-five men of Kentucky sent a petition to the Congress, asking protection from foreign competition in the matter of hemp, cordage and sail duck. They said that Kentucky used to export flour and tobacco, but that these would no longer pay.

It becomes, therefore, necessary to abandon these unprofitable articles, and resort to some other more likely to give encouragement to industry and commerce. In doing this, your petitioners acknowledge the kindness of nature, which, though she has thought fit to remove us far from the ocean, has, nevertheless, bestowed other blessings upon us, which, under a wise government, fully counterbalance this disadvantage. Hemp has, heretofore, formed a considerable object of attention to the cultivator. That article, however, neither in its raw nor manufactured state, has been exempted from the general effects of peace; and the citizens of this state, who have, hitherto, derived from the sale of it great aid in enabling them to meet the demands of their governments, will, henceforth, lose this valuable resource, without the interposition of Congress. Your petitioners beg leave to state, that their country, both as to soil and climate, is well adapted to the raising of hemp; sufficiently so, not only to supply the consumption of America, but to yield a surplus for foreign markets. But, whether from the effects of despotic governments, the cheapness of labor, a more improved cultivation, or a more bountiful soil, the Northern States of Europe are able to undersell us in the article of hemp. Your petitioners, therefore, pray that congress will lay a duty on hemp, cordage, and sail duck, imported from abroad, adequate to prevent or lessen the sale of it, and to give encouragement to the husbandmen and manufacturers of our country, the present duty being insufficient for those purposes.

The committee, to whom the above was referred, said that the duty on hemp was then $22.40 a ton, which was twenty per cent. of its prime cost in Europe; that the duty on sail duck was twelve and one half per cent. *ad valorem;* that any further duty on these would make ship builders equip their ships abroad, and thus hurt the petitioners and other growers and manufacture

[1] *American State Papers,* 7C., 1S., H. R. No. 173.

of hemp in the United States; and the committee therefore advised against the increase asked for.

In the *Gazette* of July 5, 1803[1] is the following: "John and William Bobb will purchase a quantity of Flax and Hemp Seed delivered at their oil mill near Lexington; for which the customary prices will be given in Cash and Merchandize." Other such notices are found.

During the spring of 1804 "Americanus" stands at "eight dollars the season * * which may be discharged in hemp, at four dollars per hundredweight, delivered in Lexington."[1]

On March 20, 1804 "Aristides" begins a series of articles in the *Gazette* on political economy. He promised to show in one of these "the impropriety of shipping hemp in the raw state;" but unfortunately this article is lost.

On August 7, 1804 a letter from Natchez says that the market for rope and Kentucky bagging is dull.[1] On January 15, 1805 the New Orleans prices for December 14, are quoted. Cordage is $12 @ $14 a hundredweight. Freight to the Atlantic ports is given at two cents a pound. It will be noticed that the first effect of opening the port of New Orleans to free trade was unfavorable to our hemp industry, as reflected in prices.

In the spring of 1805[1] Americanus stands at $8.00 the season, payable in hemp at $4.00 a hundredweight; and on March 26, "Tup" stands at $22.00, payable in hemp at $4.00 a hundred.

On November 10, 1806 appears an advertisement of the Madison Hemp Spinning Factory.[1]

On May 16, 1809 hemp is quoted at $8.00 a hundredweight, in Lexington.

April 11, and for some time thereafter, appears a notice of a hemp-brake patented by Thomas Cohoon, then running near Lexington.[1] From the description it could not have been much of a success.

In June 1809[2] John Allen and others sent a petition to Congress asking protection for the hemp industry:

[1] *Kentucky Gazette.*
[2] 11C., 1S., H. R. No. 302.

The subscribers having, since the passage of the acts commonly called the 'embargo' and 'non-importation acts,' engaged in the manufacture of hemp into linen, and many of them having expended a great part of their respective capitals in preparing machinery and erecting buildings to carry on the same, beg leave, upon the approach of a new state of affairs, to call the situation to the attention of your honorable body. Whilst they rejoice, in common with their fellow citizens, that the returning sense of justice of one of the great belligerent powers of Europe, as displayed in some recent communications to our government, affords a hope that our country may escape the calamities of war, they must be permitted to state that this cause of national rejoicing will, in all human probability, be greatly oppressive to them. Their establishments have grown out of our differences with foreign nations. 'The non-importation act,' which was passed, as your petitioners always understood, as much to change the direction of the national capital from commercial to manufacturing pursuits, as with a view to bringing a great foreign power to a sense of justice, by prohibiting the introduction of foreign linen, etc., into the United States, gave being to their manufactories; and with the further patronage of your honorable body will, beyond doubt, rapidly increase in the western country. Already there is manufactured in Kentucky a quantity of baling linen sufficient for the consumption of the greater part of the cotton country; other manufactories are erecting, and several citizens are extending their views to finer linens and sail cloths. Such, however, is the superiority of European capital and art; such the cheapness of the labor of Great Britain and Ireland; such the aid given there to manufactures by bounties from the government; such the obstacles which an American manufacturer has to combat and overcome; and such the lessons furnished by experience; that your petitioners forebode the annihilation of their respective establishments, unless some aid is afforded them, at this moment by the interposition of Congress * * * Your petitioners deem it material to represent, that the 'non-importation act,' by creating a demand for the articles which the act prohibited, has changed the direction of much capital, and caused the erection of buildings which must now become waste, without the interposition of Congress. That if it be important to encourage manufactures, and if they promote national wealth, by encouraging national internal industry; if they keep money at home, by preventing it from going abroad for foreign productions, if they give life to the industry of the farmer, the planter, and the mechanic, there can be no question upon the subject. This is the time to encourage them effectually. If those which are erected are suffered to go to waste; if those recently

established die with the law which gave them being; an age shall pass away before other citizens embark upon the same business. Ill success, upon the part of one manufacturer, will prevent others from engaging in the same pursuit; success that crowns every measure with popularity produces herds of imitators and followers.

Nor can it be an unimportant consideration with Congress, that the encouragement of domestic manufactures will have a tendency to transplant the arts and capitals of Europe, in the country, by holding out inducements to artists and manufacturers to remove here.

The subscribers cannot quit the subject without some remarks upon the peculiar situation of the country in which they live. Kentucky is rich in soil, but at a distance from the seas. She is capable of producing hemp for the whole supply of the United States—an article perhaps as much wanted as any other, both by the Government, and by private citizens, engaged in every pursuit of life; which, to an enormous amount, is annually imported from the northern parts of Europe, and which can not easily be procured in time of war. If the manufacturers of Kentucky were sufficiently encouraged, they would induce the farmers to cultivate it, so as to furnish a never failing resource whether in peace or war. The proximity of Kentucky to Ohio and Indiana subjects her to considerable drains of treasure for United States' lands. Large sums are annually taken off for foreign productions, and merchants in the Atlantic States, who are the real collectors of the revenue, pay, for Kentucky, her quota to the treasury. Protected as she is by the Union, with this arrangement she is satisfied. But when the fishermen of the East are not only encouraged by protecting duties, but also by bounties; when, comparatively speaking, no public moneys are expended here, but all in Washington, and on the sea board, in salaries, buildings, fortifications, upon the army, and on the navy, for the protection of commerce, in which, from her local and insular situation, she cannot participate; she would be better pleased if she was indemnified, for these disadvantages, by some encouragement of her industry; and that, perhaps, can best be done, with public benefit, by protecting duties to the manufacture of what promises to be her staple article.

It will be noticed that the petition of 1802 was a respectful request for protection, made by a few manufacturers. The present, plainer statement of the case speaks with the voice of the state, and savors somewhat of a threat. Selfish as this policy was, it was much more effective. The next year Mr. Clay

was sent out as the champion of Kentucky hemp, and throughout his life did good battle in its behalf.

In the Gazette of September 5, 1809 Nathaniel Foster advertises:

> **The patentee has now in operation at his residence in Flemingsburg, one of his lately invented machines for spinning hemp and flax; from which he is enabled, from experience, to say, that four boys or girls of twelve years of age, can and do spin sufficient warp and filling for 50 yards of cotton bailing, 40 inches wide, per day, with ease.**

Tow was used for the filling in cotton baling.

October 24, 1809, the Lexington price of hemp was $6.00 a hundredweight, and yarns $9.00 a hundred.[1]

Gallatin, in his *Report on Manufacturers*,[2] says that there were fifteen rope walks in the state in 1809, which used 1000 tons of hemp a year, and that six new works would be ready by the next year. He also says that there were thirteen bagging mills, five of which, in Fayette County, made 250,000 yards of duck and cotton bagging a year.

In the months of December 1809 and January 1810[3] 1,378,944 pounds of hemp and spun yarn were shipped from Kentucky through Pittsburg, all averaging fifteen cents a pound.

On January 2, 1810, hemp is quoted at $6.00 to $7.00, and yarns at $9.00 to $10.00 a hundredweight in Lexington.[1] On January 16, appears the following, under the heading, "Important Rumor:"

> **Letters have been received from Sweden to the third instant. A report prevailed at Gottenburg on the authority of communications from Stockholm that the four principal powers of the Baltic, Russia, Sweden, Denmark and Prussia, had come to a determination to close that sea against the shipping of every other nation, with the exception of the French.**

Naturally, we soon after find the notice, "Hemp has risen

[1] *Kentucky Gazette.*
[2] *Cf. American State Papers.*
[3] *Eighth Census,* article on "Hemp."

within a few days one dollar on the hundred—the present price is seven dollars cash."

On April 6, 1810 Henry Clay proposed an amendment to a bill in the United States Senate, instructing the Secretary of the Navy to give preference to American-made cordage, sailcloth, hemp, and so forth, in buying for the navy.

With very little encouragement from government, I believe we shall not want a pound of Russia hemp. The increase of the article in Kentucky has been rapidly great. Ten years ago there were but two rope manufactories in the state. Now there are twenty, and between ten and fifteen of cotton bagging; and the erection of new ones keeps pace with the annual augmentation of the quantity of hemp. Indeed, the western country, alone, is not adequate to the supply of whatever of this article is requisite for our own consumption, but is capable of affording a surplus for foreign markets. The amendment proposed possesses the double recommendation of encouraging, at the same time, both the manufacture and growth of hemp; for by increasing the demand for the wrought article, you also increase the demand for the raw material, and consequently present new incentives to its cultivator.

On May 15, 1810,[1] the Madison Hemp and Flax Spinning Company advertise

Fifteen hundredweight of four and six hundred hemp thread for sale * * * This thread was spun by machinery, and is of an excellent even quality. The friends of home manufactures have now an opportunity of encouraging a useful undertaking. The company will give out thread to be wove at the usual prices.

On June 5, a Lexington "Oil floor-cloth factory" argues that "the consumption of cloth used for this purpose will increase the sale of hemp, so that it will be an advantage to the farmers and manufacturers of this article as well as to the proprietors of this factory." They also hinted that the western states might in this matter become independent of all other markets. Their prices for oil cloth were $1.25 to $1.75 a square yard.

[1]*Kentucky Gazette.*

September 11, 1810, George Trotter advertises for black or white spinners for the year 1811 to work in his rope walks.[1]

On September 18, 1810, "A Manufacturer," writing on protection to home manufactures,[1] says that hemp and cotton then bade fair to be the staples of Kentucky and Tennessee. He says that eleven years before, Lexington had but one rope walk running, which soon after failed, "although hemp was then frequently at $4.00 a hundredweight, and never higher than $5.00." He knew of only one other rope walk in Kentucky, at that time, which was at Frankfort; and reckons that both together did not use over 150 tons of hemp a year. At present, he says, there were eight large rope walks at Lexington, and others building. There were also three bagging factories, and two sail duck factories in Lexington. He says that the increase in other counties was nearly as great, and puts the state increase for the eleven years at forty-fold. He felt much encouraged by the general industrial activity, but feared that our manufactures would in time be "overwhelmed by the immense capitals" of their competitors. The "Memorial of the Mechanics and Manufacturers of Lexington," which was sent to Congress about this time, also shares this uneasiness.

On December 18, 1810, Waldemar Mentelle advertises "Flanders fine hemp linen" for sale in Lexington.[1]

The Eighth *Census* says that Kentucky supplied nearly the whole of the cotton country with bagging in 1809 and 1810. The freight from Louisville to the Atlantic coast was then $40.00 to $50.00 a ton.

The results of the census of 1810, as regards hemp, are to be found in the Tables. Besides those figures, Niles' Register says that from October 5, 1810 to May 5, 1811, 63,056,200 pounds of hemp, 113,015 pounds of yarn and cordage, and 8,140 yards of country linen passed the falls of Ohio. The committee of Congress on Commerce and Manufactures reported, on January 21, 1811, that between November 24, 1810 and January

[1] *Kentucky Gazette.*

24, 1811, 27,700 yards of bagging, 150,000 pounds of rope yarn, 20,784 pounds of bale rope, 1484 pounds of thread, and 479 pounds of tarred rope were shipped down the river from Kentucky. There were also nine oil mills in the state in 1810.

Tench Coxe said[1] that,

> **The ability to produce hemp is enjoyed by every State in the American Union. Soil, climate, industry, machinery, situation, and the possession of the raw material, appear to have carried this branch to the greatest height in the State of Kentucky, even since the extension of the cotton culture in that quarter * * * The cultivation and manufacture of cotton have suddenly and greatly interferred with the manufacture of this raw material.**

He added that women could not work to advantage in hemp, because the spinning and weaving required strong hands. "No manufacture appears to demand, in greater degree, the aid of *joint stock, or associations* of capitalists and manufacturers." It will be well to remember this last and shrewd observation in our study of later developments. The *Eleventh Census* reckons the value of the industry to the state in 1810 at $1,200,000, and says that the crop yielded, in places, as high as $200.00 an acre. This hardly seems probable.

On February 21, 1811 the Secretary of the Navy reported on the culture of hemp.[2] These reports come rather regularly henceforth for forty years. Secretary Hamilton deplored dew rotting, water rotted hemp being better in every way, especially in its capacity to hold tar. He said that dew rotted would do very well for standing and running rigging, while "American water rotted hemp is no doubt in all respects equal to the best Russia hemp; indeed, I rather incline to think it superior." He thought that Congress would do well to give him an allowance with which to buy American water rotted hemp and American-made canvas; and if this were done, he thought that the contracts should be made before the season opened.

[1] Coxe, *Statement of the Arts and Manufactures of the United States in* 1810.

[2] *Sen. Doc.*, 27C., 2S., No. 6.

An advertisement in the *Gazette* in 1811 reads: "Six dollars, cash in hand, will be given by Morrison, Boswells & Sutton, for water rotted hemp of the best quality, at their factory in Lexington.

The first regular steamboat running on the Mississippi, the "New Orleans," was built in 1811.[1] Niles said of Kentucky:[2]

> The hemp raised in 1811, was nearly double the quantity raised the preceding year. It is stated that the number of rope walks have doubled since 1810; some of them are very extensive establishments. The quantity of cotton bagging made is calculated at one million yards per annum. The cheapness of living in Kentucky, and the distance of a great part of the state from a market for its agricultural products, have taught the people the important advantages to be derived from giving to their commodities an icreased value by labor, which so much reduces the proportionate charges of transportation. We look to Kentucky for a full supply of such sail cloths sheetings and linens as were heretofore received from Russia. In 1811, its manufactures were valued at $500,000.

He says of Louisville: "It is happily situated for manufactories of grain, hemp, iron, etc., having any extent of water power * * The rope walks are extensive, and much bagging is made."

Secretary Upshur states[3] that the price of Russian hemp in 1810 was $450.00 a ton, though it fell to $200.00 in 1811. He says that before the war of 1812 the navy had used much Kentucky cordage, and that in 1813 and 1814 they used 181 tons of Kentucky hemp.

On January 28, 1815, Niles says of Lexington:

> This town, which promises to be the great inland city of the western world, is situated in the center of an extensive plain of the richest land. It is the seat of a great commerce, and has many flourishing manufactures. Mechanics of all descriptions receive nearly double the price for their labor that they get to the eastward,

[1]Niles' *Weekly Register,* March 27, 1830.
[2]*Ibid,* for June 11, 1814.
[3]*Sen. Doc.* 27C., 3S., No. 6.

and the expences of living is not more than one half. They are greatly wanted to keep pace with the rapid improvement and increase of manufactures in that place. Hemp is $80.00 a ton.

In the *Gazette* of September 30, 1815 we find, "5000 yards of tow linen wanted immediately by W. C. Bell."

On November 27, 1815 J. & T. G. Prentiss, paper makers in Lexington, offer to pay six cents a pound "for fine bleached linen and cotton rags—and a price in proportion for coarser quality, or for tow made from flax or hemp."[1]

New Orleans prices for November 27, 1815, are given on December 16, as follows: Kentucky bagging, twenty-five to thirty cents; cordage, ten to thirteen cents; Kentucky hemp (none on the market); Kentucky hemp yarn, eight to nine cents; (dull).[1]

In his message to the legislature in 1815[1] Governor Shelby said:

The navigation of the Ohio and Mississippi rivers by steamboats, regularly sailing up and down those waters, afford to our country, a fair prospect of receiving many of our imports upon much cheaper terms than can be obtained by bringing them from the ports of the eastern states. Should this succeed, it will also be highly advantageous in opening a direct barter of our export produce for our imported goods, thereby saving to the state the commissions and per centages of the intermediate agents and merchants employed in our present circuitous trade.

In 1817, Fearon[2] came down the Ohio; but as he was much hurried, he saw little of Kentucky. "This at the time was a source of regret, as I had imagined Lexington, from its high reputation, to be a Paris in miniature;" but he quotes a letter sent him by a friend in Lexington. He said that,

One thousand to fifteen hundred pounds of tobacco, and about the same quantity of hemp may be taken as fair averages (per acre) although frequently much greater quantities are produced. The price of good field Negroes is now about $800. The annual expence

[1] *Kentucky Gazette.*
[2] Fearon, *Sketches of America.*

of such hands may be estimated at from $75 to $100; ditto for clothing at from $12 to $15 more;—say together, $87 to $115, or an average of $100 per annum. Their provisions differ but little from those of hired white servants.

He further says: "In general, farmers command a ready cash sale for their produce. The old custom of carrying it to the New Orleans markets is nearly superseded by a new order of tradesmen, who are a medium between the western farmer and the New Orleans markets." The exports of "cordage, hemp, and fabrics of hemp" for the season of 1816 are given at $500,000.

He adds:

But as Kentucky is perhaps the strongest member of the western body, and must, of necessity, influence its growth and healthfulness, and as in this state the vitally interesting subjects of agriculture and manufactures have received a considerable degree of attention, I forward you an estimate that has just been made by some very judicious men of the state of manufactures in Lexington.

In the list are twelve factories for cotton bagging and hempen yarns, employing a capital of £100,400.

Flax and hemp seed sell from 2s. and 3d. to 2s. 8½d. a bushel. The price of boating goods from New Orleans to Louisville (1412 miles), is from 18s. to 22s, and 6d. a hundred. The freight from New Orleans from hence, is 3s. 4½d. to 4s. 6d. a hundred. The average period of time which boats take to go to New Orleans, is about twenty-eight days; that from New Orleans, ninety days. Steam vessels effect the same route in an average of twelve days down, and thirty-six days up, when their machinery does not meet with an accident.

In 1819 Warden said[1] of Kentucky:

Hemp and flax are now cultivated to a considerable extent; the former sells at the rate of eighty dollars a ton, the latter at fifteen dollars per hundredweight. * * * At Lexington there is a woolen and a cotton manufactory on an extensive scale, employing 150 hands each, and several of smaller size, an oil cloth and carpet

[1]D. B. Warden, *Statistical, Etc., Account of the United States of America.*

manufactory; a steam rope manufactory; four nail factories, which make seventy tons of nails yearly; two copper and tin manufactories, three steam grist mills, three steam paper mills, several ropewalks and bagging manufactories, which consume 14,000 tons of hemp yearly. The manufactures of hemp at Lexington in 1811 were valued at $900,000 * * * At Danville, several mills, factories and rope-walks; at Frankfort, hemp manufactories. At Shipping Port, a rope-walk 1250 feet long.

During 1820 several "makers of bale rope, cables, and tarred rope equal to any in the United States," advertised for hemp, offering the highest cash price.[1] Steamboats also run through from Frankfort to New Orleans. Niles says, on September 2, 1820,[2] that corn was selling at ten cents a bushel, and wheat at twenty cents in specie in Kentucky.

The census figures for this year are given in the Table. No returns were made for the counties of Bracken, Breckinridge, Caldwell, Campbell, Casey, Christian, Clark, Cumberland, Floyd, Grant, Harlan, Hopkins, Knox, Mason, Muhlenberg, Nicholas, Owen, Pendleton, Pulaski, Rockcastle, Todd, Trigg, Union, Warren, Washington, and Whitley. The returns for Mercer were left out of the first report, but were published later.[3]

On March 21, 1821, Niles says, "The Messrs. Johnsons, of Kentucky are preparing to establish a line of steamboats, to ply direct from Louisville to Havana, which is considered a matter of great importance to the western country." On August 25, he said that there were then seventy-two steamboats on the western waters, some of which were over six hundred tons.

On September 15, 1821, Niles comments on

Mr. Clay's eloquent speech in favor of domestic industry, wherein he referred to the family of the venerable Col. Shelby—the hero of King's Mountain in the Revolution, and who so firmly led the Kentuckians as his children, to battle in the late war. His family is clad by the labor of its own hands, 'the spinning wheel

[1] *Kentucky Gazette.*
[2] Niles' *Weekly Register.*
[3] 17C., 2S., H. R. No. 675.

and the loom were in motion by day-break'—the matron delighted to show her friends the stores of goods laid aside for her daughters, on the days of their marriage. Let the painted dolls of our cities sneer at such things as they please—the daughters of Isaac Shelby, whether at the spinning wheel or in the drawing room, possess a real dignity that would, of its own force, put to flight a whole squadron of these semi-men called dandies, while gathering to itself the attentions of the good and virtuous. These are not of those who live a rickety life of a few years, and, after giving birth to two or three sickly children, die off with consumption by inches—miserable to themselves and rendering misery to all around them.

The Eighth Census says that in 1822, Scotch bagging sold in New Orleans at fifty cents a yard; and that in 1823 Kentucky bagging sold there for eighteen to thirty-two cents a yard, while Scotch bagging was reduced to twenty-two to twenty-six cents a yard. The point is obvious.

Bishop says[1] that in 1824,

On cotton bagging, a specific duty of six cents a square yard was proposed, intended to be protective and prohibitory, for the benefit of Kentucky and the Western States, which consumed large amounts of cotton already protected by three cents a pound. This duty was strongly resisted by the members from the Cotton states, who regarded it as a tax of over $200,000 per annum upon the cotton growers, who used some four million yards annually, for the benefit of a few hundred workmen in Kentucky.

It is rather hazardous to quote Bishop, but he is graphic enough. Cotton bagging was scarcely ever made of cotton.

On February 23, 1824 Secretary Southard reported[2] on the quality of American, as compared with Russian hemp cordage. The American hemp was practically all dew rotted. He said that dew rotted cordage, when new, was sometimes as strong as water rotted, but as a rule, was not reliable. He said that much hemp was grown and made up in Kentucky, and that as early as 1813 Kentucky had shipped one hundred tons of

[1]Bishop, *History of American Manufactures.*
[2]*Sen. Doc.* 18C., 1S., No 242.

cordage to New York. He thought it a pity that more water rotted hemp was not made in the United States.

On January 25, 1825[1] the Secretary again reported on the same subject. He covered the whole field fairly well, quoting a number of authorities, and touching most of the important points in the growth, preparation and manufacture of hemp. Some New York manufacturers said to him; "With respect to the extent to which it may be cultivated, we have no hesitation in expressing our belief that Kentucky alone can furnish a sufficient supply for the consumption of the United States." The same men had some unrotted broken hemp from Kentucky, and thought that it would make strong cordage, and intended to test it with the Russian. They said that Kentucky was the only one of the United States where hemp was raised in any considerable quantity. Another manufacturer, explained that there is an oil in hemp, which is the "life" of the lint, and which is saved in water rotting; but that it was lost in dew rotting, which was the practice here. Another said:

> Of two ropes, each two and one-half inches in circumference, one made of hemp grown on the Connecticut river and water rotted, broke with 3209 pounds. The other, made of clean St. Petersburg hemp, broke with 3118 pounds. A third rope, made of Kentucky unrotted hemp, broke with 2968 pounds.

He said that the Kentucky unrotted hemp had been injured in the trip, and had lost some of its strength. A manufacturer from Norfolk in Virginia said: "In 1809 and 1810 we had hemp and yarns from Winchester, Kentucky, the staple and quality very good and well handled; we then thought it only required to be water instead of dew rotted, to be equal to any we had seen."

On March 30, 1824 Mr. Clay said in Congress:

> I have before had occasion to state, and will now again mention the beneficial effects of American competition with Europe in furnishing us a supply of the article of cotton bagging. After the late war, the influx of the Scottish manufacture prostrated the American establishment. The consequence was, that the Scotch

[1] *Sen. Doc.* 18C., 2S., No. 253.

possessed a monopoly of the supply; and the price of it rose, and attained, the year before the last, a height which amounted to more than an equivalent for ten years protection to the American manufacturer. This circumstance tempted American industry again to engage in the business, and several valuable manufactories have been established in Kentucky. They have reduced the price of the fabric very considerably; but, without the protection of government, they may again be prostrated, and then, the Scottish manufacturer, engrossing the supply of our consumption, the price will probably again rise. It has been tauntingly asked, if Kentucky cannot maintain herself in a competition with the two Scottish towns of Inverness and Dundee? But is that a fair statement of the case? These two towns are cherished and sustained by the whole protecting policy of the British Empire, whilst Kentucky cannot, and the general government will not extend a like protection to the few Kentucky towns in which the article is made.

Mr. Webster opposed the duty, as clashing with the ship-building interests. He said that 6000 tons of hemp were imported into the United States the year before, paying $30.00 a ton in duty; and that the whole burden of this tax fell upon ship-building. He said that hemp could then be bought in St. Petersburg for $101.67 a ton; that the cost of loading on ship-board was $14.25 a ton, the freight, $30.00, and the duty, $30.00 a ton. This gave, all told, a protection of 75 per cent. to the American manufacturer. He said that it was acknowledged that dew rotted hemp was not good in ship-building, and that there was no American water rotted on the market. Nevertheless, Mr. Clay won the day, and yet again in 1828. Mr. Webster forgot that Kentucky was as far from the Atlantic markets as was Russia.

In 1825 a number of experiments were made by the navy to find how Kentucky hemp compared with Russian in various uses[1] The results of twelve tests of American and Russian water rotted gave an average strength of 140 for the American, against 123 for the Russian. Some experiments were also tried to test the endurance of unrotted lint, and of dew rotted, treated with pyroligneous acid to preserve it. The dew rotted lint, when

[1] *House Doc.*, 20C., 2S., No. 68, vol. iii.

so treated, was found to require only one-eighth of the ordinary amount of tar used to preserve cordage, and was stronger, when new, than Russian; but it resisted sea water poorly. The unrotted lint was found to contain the elements of decay in the gums left in it. A test was also made on the ship "Constellation," one side being rigged with Russian, and the other with Kentucky dew rotted, which had stood a year in the stack before being rotted.[1] At the end of the two years' cruise, so rigged, the commander of the ship said: "I have given a fair trial to the Kentucky hemp for rigging; if there is any preference, I would give it in favor of the Russian." Mr. C. S. Todd, of Kentucky, was much interested in these experiments on the Constellation, and prepared some hemp in the same way, by stacking over a season before spreading to rot. He sold some of this to an experienced manufacturer in Baltimore, who paid him the same price, and pronounced it fully as good as the best Russian water rotted.

On January 15, 1828[2] Congress examined a number of men "in relation to hemp, flax and sail duck," with reference to an increased duty on these. Hon. Jas. Clark, of Winchester, was asked as to the price of cleaned hemp ready for the factory, during the last three years in Kentucky. He said that in the last year, the price fluctuated about $5.00 a long hundred, and that two years before that, it had hovered around $4.00. He stated that the soil of the Blue Grass region was well adapted to hemp, and that hemp was an important business there; but that much more could be raised, if the prices were better. He added that it was made up chiefly in Fayette, but also in other counties. Much of it was made into cotton bagging, yarns and cordage. He thought that neither the grower nor the manufacturer got a fair compensation for their labor employed, although he said he had not studied the matter thoroughly. He considered it important to all Kentucky to have an increased duty on hemp. He knew nothing of the quality of Kentucky bagging, "but from conversa-

[1]Letter of Minister Todd, 20C., 2S., No. 68, Vol. iii.
[2]H. R. 20C., 1S., No. 843.

tions which I have held with intelligent cotton growers in the southwestern states, the Kentucky bagging is esteemed from one and a half to two cents per pound better than that imported." John Travers, of the Phoenix Mills, of Paterson, N. J., said that he was the only man in the United States, who had spun hemp by machinery. We have seen that this was not true.[1] He stated that the "American" hemp was grown principally in Kentucky, and that the present price of Kentucky hemp was $125.00 a ton. He added that Russian hemp duck was worth fifty-six cents a yard, and recommended an increase in duty.

On February 28, 1828 Niles says: "The price of hemp in Kentucky has, for two years had an average value of only $100.00 per ton; and yet the manufacturers of cotton bagging and cordage do not appear to have received a fair compensation for their labor."

Bishop states[2] that in 1828,

> Lexington had ten bagging and bale rope mills, working 500 men, of whom 98 per cent. were Negroes. There were as many more mills in other parts of the state, altogether making nearly one million yards of bagging, and 2,000,000 pounds of bale rope, besides large quantities of twine and yarns.

He says that Lexington also had numerous other rope walks, that 2000 tons of hemp were raised every year in the neighborhood of Lexington, and that the culture was greatly increasing.

James Buchanan said in Congress in 1828, that the ship-builders had no right to complain of the hemp duties, because ship-building was itself a protected industry. He said of our capacity to produce hemp,

> There is a single state of this union—a state whose soil is naturally more fertile, in my opinion, than that of any other, of which I am reminded by the gentlemen now in my eye,(Mr. Clark, of Kentucky), capable of producing hemp in abundance to supply the world.

On January 31, 1829 Niles says:

[1] *Cf.* pp. 28, 31, etc.
[2] *History of American Manufactures.*

Hemp at Lexington, is worth only four cents a pound, about half the price in the Baltimore market. When the 'system' shall have added the Baltimore and Ohio Railroad to aid the internal commerce, hemp at Baltimore and Lexington will not vary one cent per pound in price—for the benefit of the grower and the consumer.

On January 31, 1829 Secretary Southard reported[2] on the comparative advantages of hemp and cotton for making sail cloth. He said that cotton worked fairly well in light sails, tarpaulins, and so forth, but that it would not do for topsails or courses on large ships, because not strong enough, though it was cheaper. He thought that American water rotted hemp was slightly better than Russian, because the Russian might be hurt in transportation. He said that hemp or flax canvas, of the best quality, was worth forty-seven and one-half cents a yard, while the best cotton canvas was forty-one cents.

On November 21, 1829 Niles said that it took four and one-half pounds of bagging to cover a cotton bale[1] At another time he says that it took seven yards, and other authorities state that hemp bagging weighed one and a half pounds to the yard.

On February 6, 1830, Niles reported that in an experiment at the Boston navy yard, three yarns of Russian hemp broke at 69, 71 and 68 pounds respectively, while three like ones of American broke at 80, 79, and 91 pounds. The Census of 1830 gave no returns for agriculture or manufactures. The Louisville and Portland canal was opened in December, 1830, thus partially removing an ancient barrier to free trade.

On May 21, 1831 Niles estimated the exports of hemp and hempen fabrics from the Blue Grass country at $750,000 a year.

In this year (1831) the Free Trade convention met at Philadelphia, and Gallatin, in his *Memorial,* discussed the duty on hemp and flax, and their manufactures. He said that the cost of the best Russian hemp delivered on shipboard, was $130.00 a ton. The freight on this was 18 per cent., the duty being $60.00

[1]*Niles' Register.*
[2]*House Doc.,* 20C., 2S., no. 102, vol. iii.

a ton, or 46 per cent., making Russian sell in the United States for $220.00 a ton. He thought that the duty injured the American manufacturer, and did not help the American grower; that 700,000 yards of bagging were still imported, the duty on this being merely an export tax on cotton; that the duty on hemp goods hurt the shipping and ship-building interests. He said that a ship of 575 tons built in New York in that year, used 29,288 pounds of cordage, and 3337 square yards of canvas, paying on these $1,533.68 in duties, and about the same duty on the iron used.

On April 7, 1832 Niles, writing on the trade of Maysville, said that Maysville shipped 147 tons of hemp in 1827, 197 tons in 1828, 286 tons in 1829, 294 in 1830, 449 tons in 1831, and manufactured 200 tons a year. On November 24, he says that a bagging and bale rope mill had been opened in Newport, which used 450 tons of hemp a year. It made bagging "strong, compact and uniform in its texture, weighing but 26 ounces to the yard."

In 1832[1] 2,297,300 pounds of bale rope went to New Orleans, from Kentucky; in 1833, were sent 2,971,800 pounds; in 1834, 2,326,300 pounds; in 1835, 3,155,400 pounds; in 1836, 3,280,-300 pounds; in 1837, 2,816,600 pounds; in 1839, 6,310,700 pounds; and in 1840, 5,753,300 pounds. The cholera nearly destroyed Lexington and Maysville in 1833, which may account for the falling off in this year. The effects of the panics of 1834 and 1837 are also to be observed. The exports of bagging to New Orleans in 1832 were 119,750 yards; in 1833, 146,955 yards; in 1834, 116,620 yards; in 1835, 239,860 yards; in 1836, 275,335 yards; in 1837, 173,815 yards; in 1838, 211,655 yards; in 1839, 247,695 yards; in 1840, 365,320 yards.

On October 10, 1835 Niles said that a hemp cordage mill in Covington made $25,000 worth of goods (the year before). Newport made $102,960 worth of bagging, and $30,000 worth of bale rope, using 400 tons of hemp.

[1]*H. R.* 27 C., 2S., No 550.

In 1836[1] a steam rope factory was built at Louisville, which made $125,000 worth of patent cordage a year.

In 1838[1] Louisville exported 2,513,400 yards of bagging at seventeen and one-half cents a yard, and 5,586,500 pounds of bale rope, at seven and one-fourth cents a pound. In 1839, the same town exported 3,178,350 yards of bagging at twenty-two cents, and 5,462,100 pounds of bale rope, at seven and one-half cents; in 1840, 3,348,000 yards of bagging at twenty-six cents, and 5,043,700 pounds of rope at eleven and one-half cents, making the value of bagging and bale rope shipped from Louisville in the four years from 1838 to 1841 equal to $4,383,906.

The census of 1840 gave the yield of hemp and flax together, and in manufactures gave returns for cordage only. Virginia led the states by the suspiciously large yield of 25,594 tons, Missouri following with 18,010 tons, with Kentucky third. De Bow says:[2]

> By the manufacturing schedules it appears that 18,276 tons of hemp were consumed by the manufacturers of Kentucky and Missouri (in 1840), and by the receipts at the cities of St. Louis, Cincinnati and New Orleans, with proper deductions, that fourteen or fifteen thousand tons of hemp were exported in the rough to other states.

Mr. Chambers, of St. Louis,[3] reckoned that Missouri raised 1600 tons of hemp in 1840, of which 300 tons were sent to Kentucky to be made up. De Bow also says:

> It is impossible to reconcile the hemp and flax returns of 1840 and 1850. No doubt in both cases, tons and pounds have often been confounded. In a few of the states, such as Indiana and Illinois, the returns were rejected altogether for insufficiency.

In 1841[1] Andrew Caldwell, of Lexington, invented a machine which took in raw hemp, and turned out cloth at a cost

[1] *Eighth Census,* article on "Hemp."
[2] *Seventh Census,* Table clxxxiv.
[3] *Exec. Doc.* 28C., 1S., no. 34.

of three cents a yard. It made thirty yards of cloth an hour, while the best looms before this had made only forty yards a day at a cost of five cents a yard.

In 1841, Secretary Paulding reported on the use of American hemp for the navy. He thought that the quality of American water rotted hemp was as good as that of any imported, and that the industry ought to be encouraged.[1]

In 1841[2] Mason and Fleming counties raised 3000 tons of hemp, of which Mason manufactured 1200 tons.

Bishop says[3] that,

> In the year 1842, he (Roebling), made a proposition to the canal board of Pennsylvania to substitute wire ropes in place of hemp ropes on the inclined planes of the Allegheny Portage Railroad, which in those days connected the eastern and western divisions of the Pennsylvania canal.

In April 1842 the General Assembly sent a memorial to Congress, suggesting that an agency be set up at Louisville to manufacture water rotted hemp for the navy.[4] The committee to whom this was referred reported favorably to the plan, as a war measure, lest the foreign supply be cut off at a time when the navy most needed it. "Whereas it was cheaper in time of peace to buy from abroad, war would cut off this source; while cordage, sails, etc., should be on a permanent footing." They cited the case of Great Britain in 1807, and their distress when Napoleon closed the Baltic, forcing them to resort to India for a substitute.

They advocated the establishment of a plant for manufacturing as a measure of national defence. They quoted Adam Smith, that "Capital employed in agriculture sets in motion more productive labor than that put in manufactures, and thus adds more real wealth to a country." They said that the West could produce any amount of hemp, one foot in height over an

[1] *Sen. Doc.* 26C., 2S., No. 91, vol. iii.
[2] Collins, *History of Kentucky.*
[3] *History of American Manufactures.*
[4] *Exec. Doc.* 28C., 1S., no. 34.

acre yielding one hundred pounds of dressed hemp; and that men of experience declared that water rotted hemp could be made as cheaply in Kentucky as dew rotted ($120.00 a ton), if the demand for it were steady enough to justify the necessary preparations. As it was, they said that the agent paid $280.00 a ton to the contractors at Boston, and that a factory at Louisville would thus effect a saving of $150,000 a year on an investment of $33,000; that it cost $40.00 to $50.00 a ton to carry hemp to the eastern cities, while Louisville, as the center of the hemp-growing country, was already the distributing point for bale rope and bagging for the southern market, and that tar and pitch of the best kind could be obtained at Louisville. They said that the hemp growers were afraid to trust the inspectors at Boston, and run the risk of having their crops sacrificed in the open market as rejected hemp. The Memorial declared that a gentleman sent out by the navy department the summer before had pronounced a certain crop to be equal to the best Riga he had ever seen; but that this same crop was rejected in Boston. The committee believed that the Kentuckians would raise 12,000 tons of hemp in 1842, and that the federal government owed them a market in return for their heavy contributions to it; that the money they spent abroad would thus be saved to the Union, and an abundant supply be assured in case of war. They estimated that two-thirds of the hemp raised was grown within easy reach of the Kentucky river, from which it could be shipped directly to all points on the Ohio and Mississippi rivers; that manufactured hemp was exposed to much less danger from accidents in shipping than when in bulk; that if needed, dams along the Kentucky river could furnish unlimited power for factories, and that the state would rent this power on long leases, renewable at the will of the lessee.

On March 9, 1842[1] Secretary Upshur made a short report on water rotted hemp for the navy. He said that he had made a contract with a Kentuckian for hemp, but that none had been

[1] *Sen. Doc.*, 27C., 2S., no. 240.

delivered. He accordingly sent his agent to secure some by other means, and to get information as to freights, etc. He was given a sample by which to buy, and under resolution of Congress of 1841, was ordered to pay not over $280 a ton, this being $40.00 a ton more than the best Riga Rein, and not to send any to Boston unless it would probably pass inspection there. The Secretary complained that he had no warehouses for storage, and no testing apparatus.

On Dec. 17, 1842[1] Secretary Upshur made a long report on the cultivation and manufacture of hemp, which has been quoted above. He says that between 1838 and 1841 the exports of cotton bagging from the United States fell off, while the imports rose rapidly. He thought that this was owing to a great increase in the demand in the South, rather than to a decrease in the production, and that most of the bagging exported from the United States went to Texas. He said that American hemp is the best in the world, as shown by repeated tests and competent authorities; also, that the last census (1840) was not reliable, but that nevertheless, the United States were credited with 101,181 tons of hemp and flax. He recommended that a factory be built at Louisville for the navy department, or else that an agency be put there to inspect hemp for the navy, since hemp kept long in bulk was hurt by sweat.[2] He said that farmers did not like to ship their hemp all the way to Boston, even if sure of being fairly treated; as a consignment which was rejected there would have to be sold under this bad name. He thought that a good rope walk could be built at Louisville for $33,000, where hemp could be bought for $120 a ton, instead of $280, as in Boston. Under the present ruling, he said, it had been impossible to secure American hemp for the navy, though they had tried to do so ever since the establishment of the Charlestown rope walk in 1838. He added that although all the cordage and canvas used in the navy was made in the United States, they were mostly made of Russian hemp. He gave the

[1] *Sen. Doc.* 27C., 3S., no. 6, vol. ii.
[2] *Cf.* also *Patent Office Report* for 1844.

imports into and exports from the United States in 1840 and 1841, the imports of hemp and hempen goods in 1841 being worth $2,375,476. The imports of bagging in 1841 were double those in 1840, Scotland sending 2,639,861 square yards, at nine and four-fifths cents a yard. The Secretary also gave a process for rotting hemp, patented by T. H. Barlow, of Lexington, having a sample so treated; and he added a letter on hemp culture from C. S. Todd, United States Minister to Russia.

In 1843 the governments of Missouri and Indiana sent resolutions to Congress asking encouragement to the hemp industry. Sterling Price sent the Memorial from Missouri.

In 1844 Secretary Henshaw reported[1] on the cultivation and manufacture of hemp. He printed a paper by Peter von Schmidt, of Russia, and a translation of a Russian monograph on hemp, which will be quoted later. The high quality of the Russian hemp was explained by the rigid inspection to which it was subject before it could leave Russia. The Secretary gave the amounts of Russian, Manila and American hemp which had been used in the navy since 1839. He said that the present prices of these were $150.00 a ton for Manila, $280.00 for American, and $240.00 for Russian, plus the duty of $40.00 a ton.

On April 24, 1844, E. J. Morris, of Pennsylvania, said in Congress, that "Just before the Tariff of 1824, bagging sold at 35 cents a yard; in 1827, at 27 cents a yard; in 1828, at 24 cents a yard. It is now worth 14 to 15 cents." He evidently thought that the reduction was in some way connected with the increase in tariff. On May 7, A. H. Stephens, of Georgia, also declared in Congress:

> Cotton bagging, an article which was reported in the South as being so enormously taxed by the act of 1842, sells lower now than it did before the passage of the act, notwithstanding the enormous tax. * * * Cotton bagging, (Hemp) per yard, was twenty to twenty-

[1] *Exec. Doc.*, 28C., 1S., no. 2; and *Ibid. House Doc.* no. 107 and 109.

eight cents in 1840 and 1841; in 1842, sixteen to twenty-two cents, and in 1843, sixteen to twenty cents a yard.

In 1844 Secretary Mason, of the navy, forwarded some requests which he had received, that experiments be made to test the fitness of dew rotted hemp for rigging. He and the Chief of the Bureau of Contracts both recommended that such experiments be tried, but we cannot find that they ever were.

The Patent Office Report for 1844, quotes the Louisville Journal that the hemp crop of 1844 was "at least double the crop of 1843, but less than that of 1842." The Commissioner quotes Mr. Adam Beatty, of Maysville, that Maysville received in 1844 some 2,669 tons of dew rotted, and 82 tons of water rotted; or with that yet to come, 3,000 tons, of which Maysville manufactured 857 tons. He thought that 12,000 tons for the state would be a conservative estimate. "It is proper to remark that the year 1843 was an *extremely* unfavorable year for the crop, whilst that of 1842 was the most favorable year for crop that we have ever experienced." He reckons the crop of 1842 at 17,000 tons, and that of 1843 at 7,000 tons. The Commissioner says that the crop of 1844 was 15,000 tons. Quoting the Louisville Journal,

We notice seven tons of water rotted hemp, bought by Messrs. Jas. Anderson & Co., of John Steele, Esq., of Fayette county, near Lexington, for $130 per ton. We have examined whole warehouses of Riga hemp in Boston, and we think we can say, with truth, that we never saw hemp superior to this lot in any respect. It is very heavy, of beautiful color, free from tow, and perfectly clean. It is fully equal to that for which our paternal government pays Russia $235 a ton.

Quoting another paper,

Kentucky has raised, for the past two or three years, an average crop of fifteen thousand tons annually; the great bulk of which has been dew-rotted; and with the exception of a few hundred tons for twine, bed cords, etc., all of this, owing to the mode of preparation, is fit only for bagging and rope. Russia alone

raises 120,000 tons; and, as I have before said, Kentucky could be made to produce 100,000 tons, if our farmers only knew how to prepare it properly, and a machine was in successful operation to compete with the serf labor of Russia.

The Commissioner quotes a long article in the Louisville Courier, on hemp, which will be referred to later. Among other things, the article gives the value of the fertilizers and rents which the European farmers must deduct from their hemp crops and which seldom leave them a profit of $8.00 an acre.

The intelligent farmer of Kentucky will at once perceive that, in competing with the old countries of Europe in the culture of hemp, more than one-third of all the expenses they are compelled to incur, can be saved by him, as he has not the same onerous rent to pay for the land, and our soil is sufficiently fertile without much manuring. This saving to the Kentucky farmer is nearly double the clear profits realized by the European cultivator * * * These facts in regard to the culture of hemp in Europe, and the different purposes to which it is applied, are well known to those who take sufficient interest in the subject to investigate it; but I have given them, in this communication, more particularly upon the authority of Mr. Butowski, in as much as his report was published as an official document by order of the Russian government; and, in consequence, its accuracy can be relied upon * * * And when we consider the various purposes to which every quality of hemp can be applied—whether it is the manufacture of cable, sail cloth and rigging, coarse and fine linens, table cloths, bagging, bale rope, twine, sewing thread, and many other things of common use and necessity—no fear need be entertained of an overproduction. Manufacturing establishments will always spring up wherever the raw material can be obtained the cheapest; and there is no reason why the United States should not supply Europe with not only hemp for all naval purposes, but also goods of various kinds fabricated from that material. We can certainly produce hemp here cheaper than they can; and even by underselling them in their own markets, we can realize to ourselves enormous profits * * * In Kentucky there are 500 hand looms in operation, which manufacture an average of 400 yards each per week, or 20,000 yards per annum: total, 10,000,000 yards. Five power-loom factories at Louisville, New Albany, Cincinnati, and Maysville, produce per annum 3,800,000 yards.

The article says, that on the average, a pound and a half of bale rope are made for every yard of bagging; that bagging weighed one and a half pounds a yards, and that six yards would cover a cotton bale. Thus, the amount of bale rope made is reckoned at 5,700,000 pounds a year. "The hemp crop of Kentucky (say) is 15,000 tons, and worth $60.00 per ton. This is all dew-rotted. Now, *had it been water rotted,* it would have brought $180 per ton, or just three times as much." The writer estimated the hemp product as worth $2,000,000 a year to the state.

The *Patent Office Report* for 1845 says that about 6000 tons of hemp were received at Maysville in that year, from which the state crop was estimated at 18,000 tons. The Philadelphia Chronicle is quoted as follows:

Experiments were made at Louisville, Kentucky, a few days ago, with a machine for testing the strength of cordage manufactured from hemp, which showed that American hemp, instead of suffering by a comparison with the Russian article, gained by the investigation. In the test of larger cordage, the Kentucky article sustained a much greater weight than that imported from Russia.

The Report quotes a paper by Thomas S. Forman, of Louisville, to the effect that Kentucky, in 1844, produced 22,500 tons of hemp, Missouri, 12,500, and the United States, 37,000 tons; and that Kentucky made 15,000 tons into bagging and bale rope. Mr. Forman said that some merchants had taken a shipload of hemp to England, but had not made satisfactory profits from their venture; that Riga Rein sold in England for $60.00 to $70.00 a ton more than the Kentucky hemp, which was dew-rotted; but that only a few farmers had tried water rotting, and were not satisfied. He added that in 1844 we sent 12,000,000 yards of bagging, and 12,000,000 pounds of bale rope to the eastern cities, which was enough to cover 2,500,000 bales of cotton.

The price of hemp, bagging, and bale rope has declined almost in the ratio of their increased production; thus, in 1835, with a crop of 7,000 or 8,000 tons in all the western States, it was $10 to

$12 per hundredweight, bagging, 35 cents per yard, and rope 12 to 13 cents per pound. In 1840, the production had increased 50 per cent. when the prices were—hemp, $9.00 per hundredweight, bagging 25 cents per yard, and rope 10 cents per pound. Since then, under the stimulating influence of the tariff of 1842, the products are four or five times the amount that they were in 1835, and the prices now are $3 per hundredweight for hemp, 8 to 9 cents per yard for bagging, and 3 or 4 cents per pound for bale rope. These prices do not remunerate grower or manufacturer; and were either compelled to pay six per cent. interest on the capital employed, it would be ruinous * * * The cordage can be manufactured here as cheap as at the east, and the cost of transportation to any port in the United States would not exceed $20 per ton.

Mr. Forman said that he had been a grower and manufacturer of hemp for fifteen years.

A paper from David Myerle is also given. He says:

Hemp, water rotted judiciously, and handled properly, will gain from ten to fifteen pounds on the hundred above the dew-rotted, which more than amply pays for the difference of labor or expense in preparation. This has been proven to be the fact by those who have tested it at one of my pools in Kentucky, and also by an experienced farmer in Missouri.

A letter from one of the editors of the Louisville *Journal* visiting at Boston, is quoted to the effect that,

The American dew-rotted hemp is now used almost universally for standing rigging, and is getting fast into use for running rigging. Sales are now made here, at six months, for a good article of dew rotted at $100, the range being from $90 to $100. Some lots have been shipped from New Orleans to Boston this summer at less than $3 a ton; but, as freights are now $11 to Louisville, the whole freight amounts, at present, to $14 a ton * * * Cotton duck has almost entirely superseded Russia for sails * * * Cotton duck does not handle as well as hempen, but it is more durable and cheaper, and holds the wind as well. It will enjoy a preference until the Kentucky hemp duck takes the field; then, of course, it will retire, except for smaller craft in the coasting trade.

Lewis Saunders, hemp agent for the navy at Louisville, also sends results of tests made by him in 1845 on four samples of hemp, of which number 1 was 25 pounds of best American water

rotted, sent to him by the navy; number 2 was the same amount of best Riga, also sent by the navy; number 3 was unrotted Kentucky hemp, and number 4, good Kentucky dew rotted. Number 1 yielded 11 pounds tow, and held 2,705 pounds; number 2, 6½ pounds of tow and broke at 2,555 pounds; number 3, 6 pounds of tow, and bore 2,940 pounds; number 4, yielded 10 pounds of tow, and broke at 2,415 pounds strain. Three-thread spun yarn of number 1 bore 400 pounds; number 2, 365 pounds; number 3, 362 pounds, and number 4, bore 450 pounds. Marline two-thread of number 1 bore 132 pounds; number 2, 135 pounds; number 3, 112, and number 4 bore 155 pounds. One-thread yarn of number 1 held 222 pounds; number 2, 108, number 3, 140, and number 4, 190 pounds of weight. Mr. Saunders said that he had talked with the men of the Blue Grass region, and believed that the navy could make contracts for 500 tons of water rotted, at $150.00, from the crop then growing (June 1845). He gave some more tests of Russian and American water rotted, and with "humbuggery" (Rhodian, or unrotted Kentucky hemp). Of all these, the "humbuggery" made the least tow . He figured that if the ropes had been exactly the same size, the test would have shown: Russian, 2,218 pounds; American water rotted, 3,296 pounds; Kentucky unrotted (Rhodian, or "humbuggery"), 3,108 pounds strain. He added:

> Without yet having supplied any for the navy of the United States, and but little for commerce, the crop of Kentucky has averaged not less than twenty thousand tons for the last five years. The passage of the joint resolution by Congress, in 1841, giving the preference to American water-rotted hemp over the foreign article, has turned the attention, the thought, of many inquiring, ingenious minds to the subject * * * This is the commencement of an era in the manufacture of hemp, so ardently and firmly believed in by my friend John George Baxter, (now dead) more than twenty years ago. Mr. B's ideas astounded the incredulous of that period. He asserted that hemp would bleach whiter than either flax or cotton, and make the finest fabric, from lace and cambric down to good shirting, and far cheaper than either. I will, however send you Mr. Baxter's paper at another time.

Saunders agrees with Myerle as to keeping the essential oil and glutinous matter in the lint, so that it would take more tar; and that is why he distrusted chemical rotting for rope lint. "A Manufacturer," of Louisville, said that well handled hemp ought to give 60 or 70 pounds of dressed hemp per hundredweight. He said that he had been paying $3.00 a hundred, that season, "for such is the competition to purchase hemp, that it always brings the last cent that the manufacturer can afford to pay." The Commissioner also quotes Dr. Underhill, of the New York Farmer's Club: "But common hemp is becoming very interesting, as a crop in our country. Forty-five millions of pounds were raised here in 1844. A pamphlet issued by a distinguished citizen of Kentucky did greatly contribute to this result."

In 1845 Secretary Bancroft reported on the hemp-purchasing agencies in Kentucky and Missouri, regretting that they had not been able to secure the needed amount of hemp for the navy. James Hamilton had been made agent in Kentucky in 1843, and Lewis Saunders in 1845. In 1846, Mr. Bancroft again reported on the same subject, giving a table of the kind and amount of hemp bought by the Boston navy yard from 1840, to 1845, where bought, and how, and the prices paid. Only water rotted was wanted, dressed or undressed, by the long ton. The prices paid for American (mostly from Kentucky), were from $144.00 to $280.00; the Russian averaged $240.00, and the Manila cost $128.00 to $163.00 a ton. All hemp was bought by contract, inspected both at the place of buying, and in Boston; but the Missouri agent complained that the contract system gave the bounty to the speculator, instead of to the grower. A letter from Lewis Saunders, agent for Kentucky, is also given. Mr. Saunders said that until the last few years, more than three-fourths of the Kentucky crop was made into bagging and bale rope, in which dew rotted lint answered very well; that the farmers had generally gotten $100.00 a ton for such hemp, and were satisfied with this; but that it had now fallen to $60.00 a ton, and the planters were anxious to try water rotting for the navy. He said that there was a feeling in Kentucky, that the

navy department was not in earnest, because during the four years that the agencies had been established in the West, not a ton of hemp had been ordered bought from there. He said that Mr. Charles. Buford, of Scott, had sent his whole crop to Boston on a contract, and that it stood a better test there than the foreign hemp, but it was rejected on the ground that the staple was too long, and had to be sold in open market as rejected hemp; that he had reason to believe that his crop, which was so unjustly sacrificed, was bought by the speculators and sold to the navy at the highest price. Mr. Saunders said that the minimum of thirty tons was too high for most planters, and that it was also very inconvenient for them to make contracts at such a distance and then be restricted as to the time of delivery, necessitating storage and risk, with the added probability that it would be rejected in the end. He added that if the system were worked fairly, the navy would have no trouble in getting any quantity of hemp in Kentucky. He said that seven-eights of the hemp in Kentucky was spread before the advertisement for water rotted hemp appeared, and hence, none could be watered that season; and that if contracts were made ahead, to be delivered in Louisville, and paid for when tested there, the navy could get a thousand tons a year, if they wanted, water rotted and dressed, at $180.00 a ton or less. The Secretary also printed a statement of Mr. Morris, of the Bureau of Construction, giving results of some tests on ropes made of American hemp. Mr. Morris said that the strength of American hemp was about as great as that of Russia, but that it had about five per cent. more tow in it.

The *Patent Office Report* for 1847 says that the state's crop in 1847, was variously estimated at 15,000 to 20,000 tons. A Louisville man is quoted as saying that:

> The crop of Kentucky, is more certainly known to be short of the usual average. Some estimate the deficiency at one half; but allowing for the stacked-over of 1846, the deficiency may not exceed one-third or one fourth. But, be the deficiency more or less, the crop is certainly short of an adequate supply for the bagging looms and spinners now in operation; and we must be large buyers in Missouri. Last year with the accumlated stocks of 1842, '43, '44 and '45

we purchased in Missouri 3,000 tons. Our shipments to the Atlantic did not exceed 5,000 tons, so that we exported of the growth of 1846, and the accumulated stocks of several preceding years, only 2,600 tons more than we imported. We consumed last year 16,000 tons, and exported 2,000 tons, and had none left—together 18,000 tons. Allowing for accumulated old crops, say 4,000 tons, the growth of 1846 did not exceed 14,000 tons. If the growth of 1847 be one-fourth less, Kentucky can furnish only 11,000 tons for this year's consumption. What that will be depends upon the number of looms and spinners. We have not for many years past used less than 16,000 tons per annum.

The *Patent Office Report* for 1848 makes no estimate of the crop for that year, except to say that it was lighter than 1847. It quotes some experiments in water-proofing hemp, which will be given later. The Patent Office then seems to have lost interest in the matter.

In 1850 Secretary Preston reported to Congress on the subject of hemp for the navy.[1] He gives the amount of hemp bought for the navy from 1841 to 1849, inclusive, showing the kind, prices, when, where and from whom bought. He says that in 1848 Congress lowered the minimum from thirty ton to five ton (long) lots, and the maximum price to $241. If there were two equal bids, the planter's was to be chosen over the speculator's. The hemp was not to lose over 16 per cent. in preparing it for spinning. A rope made of it, of one and three-fourths inches girth had to bear 4,200 pounds. Only 500 tons were wanted. It could be delivered and inspected at Louisville, St. Louis or Boston, and had to be equal to the best foreign. If a bid were accepted, the hemp must be delivered in fifteen days, or the bid would be rejected. No bid was accepted unless it was secured, and the bidder was to state by which agent he wished to be paid, and to what agency he desired to have the contract and bonds sent for his signature. The Secretary also gives the results of a number of tests with foreign and American water rotted hemp at Charlestown and St. Louis. The Russian seemed to yield less tow, and was of a more even quality; but only

[1] *House Exec. Doc.*, 31 C., 1 S., no. 36, vol. vii.

five tests were made of the foreign, while over a hundred were made with the American. One American rope of 21 yarns of 20s bore the remarkable weight of 80,000 pounds—suspiciously great; while two others exceeded the foreign in strength and four fell just below the foreign tests. Most of the American, however, made a rather poor showing.

The census of 1850, while not satisfactory, was the best, for our purposes, since 1810. The yield of hemp was stated by counties, and water rotted and weathered were given separately. Manufacturing returns were not published until 1859, and then bagging and cordage were lumped together, and given for the state only, and not by counties. Bishop says[1] that no establishments which produced less than $500.00 a year were counted. De Bow considered the tables as worthless.

Letters from Kentucky entitled to high credit, state the water-rotted hemp for that year (1850) to be not a third as much as the census gives, and the dew-rotted to be about 22,000 tons. In this case, the whole hemp crop of 1850 may have reached 35 or 40,000 tons, and that of 1840, 25,000 or 30,000 tons.[2]

Every county in the state also raised flax in 1850, making 942 tons, all told.

In 1853, a Cincinnati market report quotes Kentucky hemp at $120.00 a ton, and dull.[3]

On January 10, 1854, appears a letter from J. C. Breckinridge, at Washington, to C. J. Saunders, hemp agent for the navy at Lexington, with information and instructions as to his duties. Mr. Breckinridge said that two-thirds of the hemp raised in Kentucky, was grown in the Eighth District (Bourbon, Fayette, Jessamine, Woodford, Scott, Franklin, Harrison and Nicholas counties), and that two-thirds of the balance was grown in counties touching this district. He said that the best American water rotted hemp was $285.00 a ton in Philadelphia, and from $230.00 to $260.00 in Lexington; that the navy used 500 tons

[1] *History of American Manufacturers.*
[2] *Compendium Seventh Census,* Table 184.
[3] *Kentucky Statesman.*

a year, and generally relied on foreign supplies, though he had been told that the American was better than the foreign, when well handled. The foreign had generally been cheaper during the last ten years, and the agencies in Kentucky and Missouri had been withdrawn in February, 1853. He gave a table of American hemp bought by the navy since 1844, where bought, the amount and price. From 1844 to 1846, Boston furnished most of it, at $195.00 a ton, with Kentucky and Missouri as competitors. After that Louisville supplied most of it, although Missouri and the American Hemp Company furnished some. The Missouri hemp generally brought the highest prices, or $225.00 a ton, the Kentucky hemp bringing about $200.00.

On February 17, 1854, Mr. Saunders announces:[1]

> **I will give a premium of a silver cup worth $10, for the best written article on the culture and preparation of hemp for water rotting; to be delivered to me by the first of April next. Also a silver pitcher, worth $15, for the best lot of water rotted hemp, over three tons, that is sold to me for the navy, of the growth of 1854. Also a silver pitcher worth $20 for the largest lot of water rotted hemp, sold me for the navy, of the growth of 1854.**

On March 21, 1854 the Louisville market quotes bagging at twelve and one-fourth to thirteen cents; rope, seven and three-quarters cents delivered at New Orleans. On November 28, bagging was fourteen to fourteen and one half cents, and rope, eight and one-fourth cents. On May 15, 1855, hemp seed (domestic) was $2.50 a bushel.

On June 19, 1855 the Lexington fair offered a premium of $3.00 for the best ten yards of hemp linen.

In 1855 the seed crop failed,[2] and the state sent Mr. Killgore to France to buy 30,000 bushels of hemp seed; but he could find only 4,000 bushels, and it was this failure, no doubt, that led to the introduction of the Chinese seed.

On March 20, 1857, the following appears:[3] "For sale!

[1] *Kentucky Statesman.*
[2] Collins, *History of Kentucky.*
[3] *Kentucky Gazette.*

Thirty bushels of cultivated Chinese Hemp Seed. Enquire at Hunter and Bruce's." On March 24, "For sale, a quantity of Chinese Hemp Seed, at a moderate price. The seed was grown by one of the most careful hemp growers in Shelby county. Warranted genuine. H. B. Howard, Louisville." Some of this Chinese seed is said to have sold at ten dollars a quart.[1]

On December 27, 1859[2] appears a letter by W. D. Gallagher on the agricultural products of Kentucky. The State government had ordered that "from and after the 10th day of January, 1859, and every year thereafter, the assessors of tax shall report the pounds of tobacco and hemp," etc., produced in the state during the year before. The yield, as thus found, for 1859, was 8,401,157 pounds of hemp, with an average value at the place of production, of $112.50 a ton. Mr. Gallagher says:

> **In the product of hemp in this state, every one will be prepared to find a great reduction. In some parts of Kentucky, wheat has taken the place of hemp, in other parts potatoes and corn as better paying crops. But Missouri is now the great hemp state and will probably remain so.**

The state census, just mentioned, has been kept up, in a desultory way, and with interruptions, ever since. It does not seem to be reliable, however, since both grower and tax assessor will generally make their returns as low as is consistent with conscience. The Board of Equalization, too, in their reports, often omit whole counties, as Fayette, the most important hemp county. These errors are relics of a time when government and people were different bodies, with clashing interests. They will probably disappear with a better understanding, on the part of the people, that they are only deceiving themselves.

The federal census of 1860 was, on the whole, the most satisfactory of all as regards our subject. Not only was the yield large—suspiciously large,—but many details were given. Moreover, it contains an interesting editorial sketch of the hemp industry in the Union.

[1]Mr. Thos. W. Scott, Versailles.
[2]*Kentucky Statesman.*

During 1861 and 1862 advertisements are frequent in the newspapers, and many of these offer "the highest market price," a phrase which had not been heard for a generation. Hemp seed was $4.00 a bushel in 1863.[1] In 1866 hemp sold for $16.00 a hundred.[2] In 1868 hemp was $10.00 a bushel and hemp land rented for $25.00 an acre.[2] Hemp seed was $7.00 a bushel.

On March 1, 1865[3] the United States Commissioner of Agriculture reported to Congress on the subject of "Cottonizing" hemp and flax. He said that the idea was not new, as the Chinese had used this method for centuries, and it had been described in England in 1747, the hemp being boiled in a potash solution, and then washed with soap. He described a number of processes, and gives some analyses, etc., which will be referred to later. It was claimed that the resulting fiber was stronger than cotton, took a better color, could be spun on cotton machinery with less waste than cotton, and was as white or whiter. These methods, and many others had long been used in Kentucky.

The vicissitudes in the hemp industry during and since the war are doubtless familiar to most hemp growers, and may be passed over briefly.

The conditions during the sixties may be described as follows: Trade with the South was broken off, thus destroying the market for bagging and bale rope, and the capital employed in their manufacture. The Confederate Congress soon forbade the growing of cotton except for home uses. Thus, the largest market for hemp was destroyed, and disturbances in the labor system combined to depress the industry so that little hemp was raised during the early sixties. The check to the cotton industry then stimulated the demand for any kind of fiber, and an opening was made for hemp to retake some of the ground from which it had been ousted by cotton. As a result, during the later sixties

[1] *Rural New Yorker.*
[2] Collins, *History of Kentucky.*
[3] *Sen. Exec. Doc.* 38C., 2S., no. 35, vol. i.

the industry grew to great proportions. The renewal of the cotton crop also revived and vastly stimulated the bagging and bale rope market. Formerly, when bagging and rope were worth more per pound than cotton, they were considered one of the expenses of cotton-shipping; now that cotton was twenty-five cents a pound, and bagging and rope were only six or seven cents a pound, rope and bagging were not spared, since they weighed in with the cotton bale. It was for the sake of the cotton spinner, rather than of the cotton grower, that iron ties were substituted for hemp rope during the years around 1870. The inability of Kentucky to supply bagging enough created the competition of jute bagging, which, during the early seventies, almost completely displaced hemp bagging. Thus, the market for hemp as cotton covering was again lost, and has never been regained.

Efforts were now made to obtain new markets for hemp. The demand for hemp in rigging ships absorbed the bulk of the output. Wire was never able to displace hemp in rigging, as long as sails were used. Hemp ropes yield somewhat, and thus distribute the strain of a storm; while wire cables allow the wind to search out the weak spots, with the result that many ships were wrecked from using them. Much tow was also employed by the eastern cities for making paper for several years after hemp bagging disappeared. The invention of the wheat harvester soon created a considerable market for hemp in making binder twine. The inability of Kentucky to supply the market at low prices led to the substitution of Manila for dressed hemp in making twine. It was subsequently discovered that binder twine could be made of hempen tow, which could compete with Manila. Twine making then absorbed most of the tow, until the increasing market led to the discovery and substitution of sisal in binder twine, which place it now holds almost exclusively. Hemp had sold as high as $14.00 a hundredweight for binder twine.[1]

The gradual substitution of steam for sails in shipping practically destroyed the market for dressed hemp in rigging,

[1]Mr. A. S. Winston, Lexington.

although a little hemp is still used on ships. This leaves the demand for hemp practically confined to the making of fine cordage, commercial wrapping twine, and carpet thread.

Prices, during this period, have fluctuated greatly, as might be expected, but have hovered about $5.00 a hundredweight, during most of the time. The threat of war between Great Britain and Russia immediately drove the price of undressed hemp to $10.00, but it fell to $4.00 before the year was out. A pool, or agreement between all the prominent hemp dealers of the state has tended, to some extent, to steady prices in Kentucky, but it would be hard to say to what extent it has controlled prices in the long run. This pool came into existence after the war, and continued until the legislature abolished it, on the charge of injuring the industry. If any pool exists now, it is secret and illegal.

Freight rates to the eastern cities have not been subject to frequent changes. For many years after the war, the rate was about $20.00 to $25.00 a ton. When the Chesapeake and Ohio railroad was built to Lexington, this rate was cut down to $6.00 or $7.00 a ton, and remains at that figure to-day.

In so far as we have records, the crop of 1860 reached the high-water mark. Since then, it has, on the whole decreased, although the relative decline has been much greater than the absolute. Whereas hemp now occupies only a small corner of the fiber market, the general demand for fiber has grown so fast that this corner is really comparable to the whole fiber market at the period with which our study begins.

CHAPTER II.

A Study of the Industry as it Exists To-day.

The present state of the industry is of more importance than its past; for in the present are, or should be embodied both the teaching of the past and the hope of days to come. For like reasons, we are inclined to attach greater importance to the experience of intelligent, living men, than to the testimony of unknown writers on the subject; although we are glad to quote the latter, whenever they seem fairly competent.

It seems more than accident that for one hundred and thirty years the production of hemp in North America has centered in the Blue Grass region, and that even here it has shown a decided tendency to keep within twenty-five miles of Lexington. If it is more than accident, the cause is worth seeking.

The geology of the state has not been examined very carefully. The traveller, however, quickly observes that Lexington stands nearly in the middle of a country whose soil is remarkably homogeneous, and that in whatever direction he goes from this spot, there are a series of well-marked changes in the appearance of the land, generally for the worse. There are some exceptions to the general decline in the beauty and fertility of the successive belts which one crosses after leaving the inner circle, or Blue Grass proper. The fertility of the first belt is comparable to that of the inner ring; the second, a narrow strip, is much inferior; while the third is broad, especially to the north-east and the west, and is much like the first. Beyond this third belt, little hemp is grown on this continent, except for experimental purposes. Little or none is grown in the second belt, but in the third lie the Shelby field, the Garrard country, which is inexplicably good, and other considerable patches, in all of which the hemp has from the first generally held its own.

From time to time, better markets have widened the margins here described, but the advantages of the inner ring are such that it can meet any ordinary variation in the demand. Wise fertilizing, or great improvements in production, such as a successful power-brake, or chemical rotting, might greatly extend the present limits of profitable culture, but these would first indefinitely increase the present yield of the inner ring.

It seems that the rocks of Kentucky were at first horizontal, with the various beds continuous over the state; and that the country around and under Lexington was raised into a considerable mountain, whose foot was nearly on a level with the surrounding country, and whose sides sloped most sharply to the south, and most gently toward the north. If this was so, the whole mountain was subsequently removed, leaving the deep-lying Lexington limestone exposed. The layers of which this bed rock are formed are phosphatic limestone of the Ordovician, or Lower Silurian period; and except in the gorge of the Kentucky river, they are the lowest in the geological series. Thus happens the peculiarity, that while water runs in every direction from Lexington, it is always going uphill geologically. Each belt, as one goes outward, laps over the one just left. Even in the innermost outcrop, or Blue Grass proper, thin flecks or patches may yet be found, survivals of the outer belts which formerly covered the whole. The soils have all been made from the underlying rock, and the erosion and fertility of the country have varied with the plant food in these rocks. The rich soils have thrown up the thickest vegetation, and have thus best protected the mother rock. Hence, even the wider Blue Grass country is comparatively level, this characteristic being best shown in the most fertile parts. Even where rivers cut through, the banks hold up well, resulting in deep gorges.

The early travellers were struck by the fertility of this country. Filson says:[1]

> The reader by casting his eye upon the map, and viewing

[1] Filson, *History of Kentucky,* p. 11.

around the heads of Licking from the Ohio, and around the heads of Kentucky, Dick's river and down Green river to the Ohio, may view, in that great compass of above one hundred miles square, the most extraordinary country upon which the sun ever shone * * * The soil of Kentucky is of a loose, deep black mould, without sand, in the first rate land about two or three feet deep, and exceeding luxurious in all its productions. In some places the mold inclines to be brown.

He should have said that it is usually brown. In Imlay we find the following:[1]

After passing the Blue Lick, the soil, if possible, increases in richness. From thence to Danville is about fifty miles. Lexington lies about midway and is nearly central of the finest and most luxuriant country, perhaps, on earth. From Lexington to Leesburg is about twenty miles; to Boonsburg it is about twenty; the upper Blue Lick nearly 30. This square, which is nearly 50 miles, comprehends entirely what is called first rate land. The soil is uncommonly favorable to hemp and Indian corn. I have known 12 hundredweight of the former produced from an acre of ground, and as much as 100 bushels of the latter. This has not only been done from an uncommonly fertile spot, but there are large bodies of land adjoining, which are equally prolific.

Hillyard says[2] that the Blue Grass region contains 10,000 square miles. The inner ring, or Lexington outcrop, with which we are most concerned, contains 1,062 square miles, according to Professor Miller of the State College. According to him, the three belts, which surround this and form the Cincinnati group, contain 7,124 square miles. He thinks that the soil of the Lexington outcrop is even richer than the underlying rock, seeming to have inherited some of the virtues of its ancient covering. It is never fertilized, being apparently inexhaustible, save in the matter of nitrates, which are easily supplied by clover, pease, locust sprouts, and seemingly by the grass itself. The principal danger is that the land tends to become heavy under steady cultivation. That is why wheat and rye improve it,

[1]Imlay, *The Western Country,* pp. 23 and 63.
[2]*The New South.*

through the great amount of trash that is turned under. Some hold[1] that rye is a positive fertilizer, like clover; and it may be that through the perfect loosening of the ground, some of the nitrogen of the air is actually entrapped by the soil itself. However it becomes about, we know that a little care will keep up the exuberant fertility of the soil to a remarkable degree, and that a few years in clover will restore it to the most exhausted land. In 1902 excellent hemp grew in Jessamine,[2] in a field that had been cultivated steadily nearly one hundred years. The soil there is eighteen feet deep. In 1903, through the agency of clover, there was a surprising growth of hemp on some old, jaded land, which, a few years before, might have been considered hopeless for hemp.[3] In 1902, the author say seventeen foot hemp following timothy.[4] Mr. Johnson says that timothy improves land. All agree that blue grass helps it, though not so quickly as clover. Even clover is not so rapid nor so sure as cow peas, but it forms a more tractable, and seemingly a more valuable by-product in the shape of hay and grazing.

The general level of the inner Blue Grass region is about 1000 feet above the sea. Lexington, the highest point, is slightly over 1000 feet, and Danville, 35 miles away, is 975 feet high. The climate is untrustworthy, the temperature ranging freely over more than 100 degrees Fahrenheit. Fortunately, hemp is a hardy weed. The rainfall is also variable, though over long periods it averages about three feet a year. Some idea of it may be gained from the following table, the rainfall being given in inches:

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1900.	2.13	3.17	1.98	1.23	3.54	2.19	2. 8	5.75	1.85	.79	6.38	1.86	32.67
1901.	1.49	.62	2.23	4.52	2.67	3. 7	2.61	3.74	2.18	1.33	1.73	3. 5	30.32
1902.	4.77	. 9	2.92	1.27	2.43	5.19	2.33	1.89	2. 6	2.11	3. 9	6. 6	36.10

The latitude of the hemp country is thirty-seven and one-

[1]Mr. Lewis Nuckols, Georgetown.
[2]Mr. John Steele, Jessamine county.
[3]Mr. George Bateman, Fayette county.
[4]*Cf.* Mr. T. S. Johnson, Fayette county.

half degrees to thirty-eight and one-half degrees. The expectation of frost is very slight after April 1st, although heavy frosts and even freezes have occurred subsequently; nevertheless, the element of risk is not great after this period.

Several factors have a bearing on the question of plowing, and consequently we find various and conflicting opinions on this point, as one or another of these factors is emphasized. If the ground be in clover, fall plowing will undoubtedly lessen, if not prevent a scourge of cut-worms, which are so apt to follow clover. A Lexington paper says on this point:

> **Cut worms destroyed 25 acres of hemp and ten acres of tobacco for Col. J. P. Chinn in Mercer. The colonel then bought seven barrels of salt and sowed it in both fields and replanted. Since then not a cut-worm has been in either of the fields. Wouldn't it be a good idea to sprinkle the salt on the ground before any planting is done? It might prove a solution of the cut-worm problem.**

Still, this evidence is not conclusive. The worms would naturally leave a field after all the green stuff was gone. It is possible, it seems,[1] to stop the spread of cut-worms by ditching ahead of them, or around those spots where they first appear. Some say that it is good to turn under timothy, rye or other green stuff in the spring, so that the worms may feed on this, instead of the hemp; but if fall or winter plowing will kill them, is not this better than feeding them? It is very likely, too, that salt enough to kill the worms would hurt the hemp.[2]

The question of the depth of plowing is also undecided. Old hemp growers[3] say that it should be shallow. Some, if not all the tallest stalks that the writer ever saw, had the tap root bent sidewise, about four inches down, where it had struck hard ground. Still, this is not conclusive. The writer examined hemp roots several times in both hard and soft ground. Where the ground will admit of it, the fine roots will go down for three feet or more. In new ground the sub-soil is lightened deep down

[1] *Cf.* Mr. Lewis Johnston, Woodford county.
[2] Mr. S. S. Boyce.
[3] Mr. Carter Moore, Georgetown.

by tree roots, and here, the hemp roots seem to go down indefinitely, having been followed downward for seven feet.[1] In fields long tilled a hard pan tends to form at the depth of ordinary plowing. Clover roots, peas and probably rye will pierce this hard pan, and thus enable the hemp roots to go down. Otherwise, they are compelled to feed from the four or five inches of soil above the pan, the great storehouse underneath being denied them. The result is, that restored land will yield, at best, two or three good crops of hemp; while new ground seems to yield indefinitely. The author saw good hemp growing which was the ninth successive crop.[2] Seventeen successive good crops have been raised from the same field.[3] It is said that twenty straight crops have been grown on the same land. Judge Van Wyck, of New York,[4] said:

> **It is admitted in Europe, that flax, although pulled when in flower, yet exhausts the land more than grain crops; when it goes to seed, it becomes a scourge to the soil. Not so with hemp, of which twenty crops in succession can be produced on the same land with but little manuring, and the last crop be perhaps a better one than the first.**

Mr. Billings says,[5] "I have known hemp grown on the same field perfectly well for twenty years in succession." This, of course, means that the best care should be taken of the soil. Deep plowing is certainly no disadvantage, for 1,850 pounds to the acre have been grown after rye had been turned under as deeply as possible.[6]

The preparation of the soil can hardly be overdone. The Louisville *Courier* says on this point:[7]

[1]Mr. C. C. Moore, Lexington.
[2]*Cf.* Mr. Ed. Bush, Bryant's Station.
[3]Mr. Chas. B. Lewis, Scott county.
[4]*Patent Office Report* for 1845.
[5]*Ibid.*
[6]Mr. Jack Richardson, Jessamine county.
[7]*Patent Office Report,* 1844.

In all parts of Europe, the greatest attention is paid to the preparation of the ground. At the last ploughing, no more ground is ploughed up, per day, than can be followed up by sowing on the same day; as the seed falling into loose and moist ground produces, in consequence, a considerable increase in the crops. Hemp, as cultivated in Europe, requires deep ploughing.

Quincy says:[1]

Hemp is said to depend more upon the nature of the soil than almost any other plant whatsoever; for which reason the Husbandman is advised if he would depend upon a crop, to prepare for it a rich, light, loamy soil, in case such is in his possession. Warm land is so essential to the growth of hemp that it will thrive better in poor warm land, than in a rich cold soil.

He thought that the land should be harrowed as fine as an onion bed, and that rich, heavy land would not yield as much hemp as indifferent land well tilled. A striking example of high cultivation was shown in a hemp field in Woodford, which was dressed over almost as smooth as a tennis court.[2]

The time of sowing depends somewhat upon circumstances. The earlier it is sowed, the less is the danger from droughth, and the greater is the danger from hail, cut-worms, and, possibly, from broom rape. Good crops have been grown from seed sown at any time between March 15[3] and the middle of June, one crop having been sowed on the snow in March.[4]

It is commonly believed that early-sown hemp weighs more than late, though opinions differ as to whether time of sowing affects the weight. It seems to be established that young hemp is not hurt even by a hard freeze.[5] Mr. C. S. Todd[6] said that the climate of Kentucky is rather warm for hemp, and thought that it would make better lint, if sowed early. He quotes Mr. Bates, of Jefferson county, who always sowed in March, and

[1]Quincy, *Treatise on Hemp Husbandry.*
[2]Mr. F. M. McKee, Versailles.
[3]Mr. W. D. Harris, Shelby.
[4]Mr. Geo. F. Keene, Shelby.
[5]Mr. W. B. Hawkins, Lexington.
[6]*Sen. Doc.* 27C., 3S., no. 6.

always had heavy yields. Mr. Todd thought that early hemp was coarser, but stronger than late sown; and that it never grew quite so tall as the late, because the strength of the plant would go rather into the lint than to making the stalk. On the other hand, one of the heaviest growing crops that ever came under the author's observation was sowed on May 15.[1] Some[2] think positively that cold weather does stunt young hemp, and late crops are often successful. In 1902 a certain field, half of which was in clover, and half in cow peas, was broken up in the spring, and sowed in hemp on April 20, the field being known to have broom rape in it. The clovered half was destroyed by cut-worms, and was replanted the last of May. The pea-stubble half was not touched by the worms, probably owing to the heat of the decaying pea stems; but it was nearly destroyed by broom rape, later on, while the replanted, clovered half grew up thick with rape, but seemed not to be at all hurt by it, and made excellent hemp.[3] Whether it was the very late sowing, the second stirring of the dirt, or the effect of the clover in neutralizing the rape, was not known.

From this maze of conflicting evidence we might come to the following conclusions: Hemp is hurt little, if any, by frost. It is easy to know if rape is in the field, since it spreads slowly. Cut-worms are uncertain, and may be largely prevented by winter plowing, or kept out by ditching. Even if the worms cut it down, there is still a chance from replanting, since their ravages generally end early in May. A drought in May is almost certain, and a shower followed by the hot sun of May is liable to bake the ground over the newly planted seed, injuring it greatly. There is some positive (and no negative) evidence that the early sown gives a heavier and stronger lint than the late sown seed; hence the conclusion that one may sow as early as it is possible to get the ground ready, which will seldom be sooner than the first of April.

[1]McGrady Brothers, Fayette county.
[2]Mr. Patrick Dolan, Scott county.
[3]Mr. C. C. Moore, Fayette county.

The choice of the seed is somewhat easier. Everyone wants seed as lately brought from China as it is possible to get it. Why so little is to be had, is uncertain. Genuine Chinese hemp seed is almost as precious as pearls in Kentucky; and although the question of seed is most important, the whole subject of procuring it is shrouded in mystery. It is very probable that any farmer in Kentucky, who should try to trace the pedigree of his "late importation seed," will find its origin lost in obscurity long before he traces it to China. He will begin to doubt whether there ever was as much as a bushel of real Chinese seed brought into the state; yet there must be unlimited quantities of it in China. It would seem that the matter is important enough to attract the attention of the Legislature. This seed, when of considerable purity, does not deteriorate rapidly. A small quantity of it may be increased to any amount in a few years, and then may be sown to crop for ten years or more before the stock begins to deteriorate.[1] On the Kentucky river bottoms the virtue is kept up by dividing a late importation of seed into several lots, only one of which is sowed each year, so that the produce of each sowing passes as "last year's importation." The seeds will keep well for several years, if hung up in small sacks; although, from the great amount of oil which they contain, they can not be kept easily in large quantities. No appearance of broom rape was observed in the river bottom seed patches.

As to the comparative advantages of lint seed and the cultivated, there seems to be little difference. Many phenomenal yields have been grown from lint seed. Some prefer lint seed, arguing that hemp is essentially a wild product, and does not love cultivation.[1] Many experienced hemp growers find no difference in results from the two. Most men prefer cultivated seed, and appeal to reason that it should be better. Some prefer upland grown to the river bottom seed, as not being so coarse. The philosophy of this is not very plain. The river bottom seeds certainly have a thoroughbred look, showing a finished, well-

[1]Mr. Lewis Johnston, Versailles.

grown appearance, with strongly characteristic markings in color, gloss, sharp edges and flavor, and uniform in quality, showing few faulty ones in any handful. Of course these facts tell nothing as to their fertility and their capacity to turn to the best use the resources of the soil into which they are put, for this can be ascertained only by trial. Over-feeding and pampering may be possible and harmful among men and women, but this danger is slight among animals, and can scarcely be said to exist in the case of seeds. Most men prefer the best and freshest cultivated seed, but the fact remains that 2,020 pounds of hemp per acre have been grown from two-year-old lint seed.[1]

Most of the important varieties of hemp seed have been tried here. The European seed seem to have been used until the later fifties, when Chinese seeds were introduced, mainly through missionaries. This seed seems to have suited the American conditions very well, and greatly improved the stock. Since then, the best seed has been an acclimated Chinese blend, with a somewhat uncertain pedigree. Of late years some Japanese varieties have been grown with some success near Danville,[2] having remarkably long and slender stalks, and a lint of very fine texture, but apparently light of weight. On the importance of a careful choice of seed, the Louisville *Courier* said of Europe: "The hemp seed is selected with much more care, as the good success of the crop depends much on the selection of the seed; and it is said, seed from one and the same field can only be used for two years on the same spot."[3] The writer, however, never heard any objection made to the growing of seed for many years in succession on the patches along the Kentucky river. Quincy thought that the seeds which first ripened were the fullest fed, and, therefore, the best.[4] The distinction may be true, but is probably of no practical value.

The question of how much seed to sow brings forth widely

[1]Mr. James Guthrie, Shelby.
[2]Messrs. Geo. Cogar and R. G. Evans, Danville.
[3]*Patent Office Report* for 1844.
[4]*Hemp Husbandry.*

different opinions. A gentleman[1] once sowed a peck of very fine seed on an old, one-acre garden. From this he got ten bushels of seed, and 1100 pounds of good lint. He regularly sows five gallons of seed per acre. Some say that a half-bushel an acre is best.[2] Opinion generally runs from three to four pecks. The writer saw good hemp growing in Scott from six pecks per acre.[3] In a virgin strip alongside this field two bushels had been sown to the acre. This strip was a complete failure, although one could not be sure that over-seeding was the cause. Several writers have asserted that two or three bushels per acre used to be regularly sowed in Europe; this would, however, seem to be impossible. The Louisville *Courier* says on this point:

> **The quantity of seed required for a certain tract of land depends on the purpose and fabric for which hemp is intended to be used. Thinly sown seed will produce strong and coarse hemp, suitable only for the manufacture of cables and the coarser kind of weaving. Seed sown very thick will produce tall and thin hemp; the fibers of which, being soft, silky, and flexible, are fit only for the manufacture of fine white linen.**

In view of this conflicting testimony, one must follow his judgment or experience. It might be that if the seed, ground and weather are just right, and the seeds are scattered so regularly and well that all will come up and grow evenly until cutting, then a half-bushel will be enough; but if we bear in mind that some will not sprout, that birds, worms, and clods will destroy some, and if we allow some for other accidents, it will be found that a bushel to the acre will not be far from right. The excess over a bushel will generally go into undergrowth.

It seems to be merely a matter of convenience or taste whether the seed be broadcast, drilled one way, both ways, or drilled over a plank. Most men now drill one way. The old method whereby it was broadcast by a dozen men tied at intervals along a rope is now extinct. If it is sown very early,

[1]Mr. Hood Smith, Winchester.
[2]Mr. John Steele, Jessamine.
[3]Mr. W. M. Peak, Georgetown.

rolling after the drill may possibly bury the seed too deep. The *Courier* says[1] that rolled land is not so apt to bake as land left in drill marks, in case a hard rain and hot sun should follow hard upon the sowing, as sometimes happens in May. Whether or not this be true, a smooth top is easier upon the reaper, and will allow a closer cropping.

The Kentucky skies are somewhat wilful, but kindly, on the whole; and if one has used his best judgment in the selection and preparation of his land, and in choosing his seed and the right time, amount and manner of sowing, looking forward according to his own experience and that of others in the past, the result is probably as certain as that of most human calculations. There is little else that he can now do but to watch the wonder of the unfolding seeds, and to see that their young hopes are not crushed by clods, or smothered under a rain crust. If this crust should come, it is possible that a second, light rolling would help more than it could hurt, by breaking this crust.

The principal pests or dangers to hemp are cut-worms, hail, broom-rape and drought. In spring-broken clover ground a cold, rainy spell in May will generally bring the worms by millions. Their spread or migration might possibly be checked by sowing a furrow with salt across their path, or by ditching, as has been explained above. It is doubtful whether they can be driven from a field already infested. In this case, replanting seems to be the only remedy.

The danger from hail is slight, and of course unavoidable. If the damage is considerable, replanting may be best, even though it be June. Collins[2] tells of a man whose hemp was destroyed by hail, whereupon he mowed it close, and got a good crop from the second growth from the roots. This may possibly be true.

Broom rape is probably the bitterest foe of the hemp. The best authority upon this subject is Professor Garman, of the

[1] *Patent Office Report* for 1844.
[2] *History of Kentucky.*

State College, who has published two bulletins upon it. He regards broom rape as a serious evil, hard to prevent, and practically impossible to remove from a field. The way in which it comes, and the exact nature of its injury are not well understood. Some have thought it a monstrosity produced by imperfect hemp seed, although botanists might deny the possibility of this. The seeds, being mere dust, might easily be carried by wind or water, or by animals, or might even cling to hemp seed, as the authorities claim. This last method of spreading may be checked somewhat by blue-stoning the hemp seed, or by careful fanning. Professor Garman thinks that its ravages are least in stiff soils, though others will disagree with him there. The injury done seems to be independent both of the stiffness or lightness of the soil, and of the amount of the rape in evidence. Cow peas leave a peculiarly light soil, but one not proof against the rape, as has been shown. Clover also leaves a light soil, yet some believe that hemp will do well the first year after clover, even though the field comes up thick with rape. It has even been denied[1] that broom rape hurts hemp, and the harmlessness of it under certain conditions has been noticed by others. Some have thought that the rape was a sign that the land was tired of hemp, rather than that the rape was a positive injury. If it be true that hemp will follow clover despite the rape, it is possible that the clover may have some chemical or other effect upon the soil, which neutralizes the effect of the rape, or else supplies the particular plant food which the rape needs in abundance for both. If either of these hypotheses be true, it ought to be possible to discover this chemical action, and to duplicate it by a commercial fertilizer.

It is of little practical importance, but it may be interesting to know, that it has been calculated[2] that hemp requires, for its full growth, twenty inches of rain, or 450,000 gallons of water per acre.

The ideal crop, when fully grown, will stand about nine or ten feet high, showing level, as one looks over the field, and

[1]Mr. Authur DeLong, Lexington.
[2]Mr. S. S. Boyce.

leaning out eagerly for light and air around the edges. The stalks will stand about one hundred and fifty to the square yard, about half an inch thick, and with a fair-sized hollow in each. Some like a stalk with a round cross-section, while others prefer one with a cross-section something like four tangent circles. Large-hollow stalks take the latter shape, while the more woody ones tend to grow round. The yield will be nearly independent of the number of stalks on a given area. There is just so much of sunshine and rain, and within reasonable limits, the stalks growing there tend to use all of these, if the ground and seed be good. Thus, whether two or six pecks be sown to the acre, the yield will probably be about the same, though the quality may differ somewhat. One bushel of seed will, in most cases, yield more and better hemp per acre than either a half-bushel, or two bushels. If excessively thin, the lint will be coarse and flaggy, and *vice versa*. The undergrowth, which was belated and overshadowed, will generally be lost in the handling, or break out as tow. A rich soil, of course, will support more stalks than a poor one.

Opinions vary as to the right time to harvest. It is thought that every kind of hemp seed has a definite time to ripen.[1] Thus, portions of the same seed will ripen about the same time, whether sown in March or May. It is doubtful whether pure Chinese seed ever ripens naturally here, frost always coming before the growth is done. Its period of growth seems to shorten with each year of our climate. A long period being an advantage, it may be said that the better the seed, the later will it ripen. In cutting, a rule which some follow is to cut just four months after sowing[2] Some wait until the first ripe seeds appear. Some cut while the pollen is rising in clouds from the field; some wait until the male stalks begin to drop their leaves and turn yellowish; others wait until these have bowed down and died, leaving the females still tall and growing, believing that the gain

[1]Mr. Walter Scott, Lexington.
[2]Mr. T. S. Johnson, Lexington.

in these will more than offset the loss of the male, or blossom stalks.[1] The rule which some follow is to harvest when a bundle of stalks rattle on being thrown, while some like to hear the stalks pop harply in cutting. Fields harvested so late that the birds had picked off all the seed have made excellent yield and quality. Small patches of hemp left standing through the winter yield a remarkably clean and strong lint.[2] It would thus seem that there need be no great hurry about cutting, although it is to be borne in mind that unless one means to gather the seed, to let it ripen is a needless drain upon the soil.

Of late years, harvesting by horse reapers has become prevalent, especially around Lexington, where labor is scarce. Machine cutting is much faster than hand cutting, and cheaper, if one sets convenience against the small loss from high cutting and clipping the butts off occasionally. If the ground be smooth, a machine will cut nearly as close as a hook will; besides, if one has much hemp, quick harvesting with one's own teams is more satisfactory than dependence upon the Negroes. An occasional Negro can cut an acre in a day, while a machine cuts ten. The writer has seen a machine cutting eighteen foot hemp, with stalks an inch thick.[3] For short hemp a clover seed harvester answers fairly well, and the experiment has been tried in cutting with a common mower having a rod fixed before the blade, and some three feet above it.[4] The rod bends the hemp forward, so that when the blade strikes it, the butts pop backward over the blade. The cut stalks are continuously held up by the standing ones ahead, so that they are not cut again, although the blade passes under them for their entire length. The draught is said to be light, and the hemp is laid down evenly, though of course not bunched, as is ordinarily done.

After cutting, it is well to have the hemp rained upon before being taken up, as there is little danger from too much rain.

[1]Mr. Jas. Guthrie, Shelby.
[2]Mr. John Wheeler, Winchester.
[3]Mr. T. S. Johnson, Lexington.
[4]Mr. L. H. Dewey, Washington, D. C.

If there is rain enough to partially rot it, no harm is done.[1] If there is no appearance of rain, it might well be taken up after one day's sunning,[2] or as soon as convenient. The leaves crisp up, and give little or no trouble, even when not beaten off before stacking. The writer has never heard of hemp molding from being stacked too soon, while it is often over-cured. It is thought that sunburning makes it hard to rot, and lowers the yield and quality, by removing part of the oil from the lint.

After curing, it is customary, in the outlying counties, merely to shock the hemp to await the fall rains. Around Lexington it is nearly always stacked, a method which is thought better, as exposing less surface to the weather, and bleaching the hemp to some extent. Shocking is cheaper, and might be about as good if the outside stalks, which rot more quickly, are stripped from the shocks and spread apart from the other stalks. Otherwise, they will injure the appearance of the good lint, or go largely into tow.

While the hemp is waiting for the winter rains, the seed is ripening. A word may be said of this industry. Formerly, each planter grew his own seed, and to some extent this is still done; but seed-growing is becoming more and more specialized, the Kentucky river bottom[1] being the favorite locality for this industry. These bottoms are very fertile, sometimes yielding thirty or more bushels of seed per acre. The hemp dealers distribute the seed to the small growers along the river, who give back a bushel for each gallon received. There seems to be a tendency to underestimate the yield as against the dealers. The stalks are given plenty of room, and grow fifteen to eighteen feet high, and two or three inches thick. The pods are gummy with resin, and the weight of seed bows the great stalks almost to the ground. The seeds begins to ripen some weeks before the stalks are cut, and the first ripened are lost.

When the frost season comes, each stalk is cut carefully to prevent shattering the seed, and three or four are stood up

[1]Mr. Hood Smith, Winchester.
[2]Mr. Harvey Vance, Lexington.

together to dry; after which they are pulled over upon a sheet, and the seed beaten out. Thus it seems hardly possible for broom rape to get on the hemp seed, even though the patches be infested. The yield from one stalk is so large, and the price of Chinese seed so high, that it might be profitable to spread sheets under the stalks for some time before cutting, so that even the first ripened seed could be saved.

The time for spreading hemp to rot depends upon the weather, and follows no hard and fast rule. Most of the hemp is generally spread in the latter part of November. According to the records of the average daily rainfall at Lexington, the period from November 15 to December 15 is one of the wettest in the year. The weather, during this period, is generally mild, thus being favorable for quick rotting. Men differ as to whether quick or slow rotting is better, but agree that the hemp will rot more quickly if it has had several summer rains on it while curing. The Negroes believe that the quality and color of hemp are much improved by leaving it stacked until the next season before spreading, and several authorities agree with them; but it is seldom that any farmer ever purposely holds over his crop. It is said that with hemp so held over, the leaves disappear entirely, the lint bleaches straw-color, it rots much more quickly, and the ends will not chop off, as ordinarily. Alexander McClintock[1] found that the weight was also increased two hundred pounds on the acre, and it graded as water-rotted. The experiment on the "Constellation" in 1825 bore witness to the high quality of hemp so treated. Mr. Todd thought[2] that the good effect of holding it over through the winter was owing to the action of frost, rather than to the sweating. The Louisville *Journal* says:[3]

> In 1822 and 1823, Nathaniel Hart, of Woodford county, stacked his hemp of bright color, and kept it in the stack sixteen or eighteen months. He spread it out to water in November, and took it up at

[1] Collins, *History of Kentucky; Annals.*
[2] *House Doc.*, 20 C., 1 S., no. 68.
[3] *Patent Office Report* for 1845.

the usual time in the winter or spring. The result was a beautiful white hemp, having in all respects the appearance of water-rotted hemp, and I believe every way equal to it. Mr. Hart, in 1824, published in the Kentucky Farmer the result of these experiments, and, as an inducement to produce such hemp, offered to purchase it at a high price; yet very little hemp has been so prepared in Kentucky. I saw yesterday, landing from the "Blue Wing." four or five tons of such hemp, grown by a Mr. Cowan, of Boyle county, sold by Mr. Bowman on the wharf for $102 per ton.

It is generally thought best to spread the hemp upon the same ground where it grew. This enables the valuable plant food in the gum and hurds to be restored to the soil whence they came.

If all the plant food that was taken up is replaced in the rotting and breaking, it is evident that hemp could be grown forever on the same ground, without rest or fertilizing. This, of course, is not true; but by measuring the leak, we might easily learn how much, and what kind of food to give the soil in order to bring or keep up its strength to the maximum.

When spreading, an effort is made to lay it as evenly and thinly on the ground as is possible or convenient, so that it may rot evenly. Where it is laid thickly on the ground, the top, bottom and middle will rot at different rates. In showery weather the bottom tends to rot most quickly; in frozen weather, with partial daily thaws, the top will rot first. Dews also act more on the top than the bottom; yet as there are all kinds of weather in a winter, the top and bottom of a swath rot about evenly. The difficulty is with the middle, and if the hemp were laid only two or three stalks deep, this difficulty would be removed. Turning over the hemp with a pole has been tried,[1] to even up the rotting of top and bottom. The pole is run under the leaf ends, and the whole layer lifted over buttwise. The work is quick and easy.

The rotting period is variable, being dependent upon the weather. When spread in November, the hemp is often ready to break in January, though it may be impossible to begin

[1]Mr. George Nuckols, Paynes.

breaking until late in March or April. It may lie dry, frozen or under a dry snow all winter without rotting, or the winter may be so wet that it will be overrotted before it ever dries enough to take up. Mr. Billings says:[1]

> The lint is covered by a thick bark or husk, containing a strong acid, which, when acted upon by the oxygen of the atmosphere forms a coloring matter which penetrates and discolors the lint, and often the boon [stalk]. The lint is secured to the boon by globules containing a species of gluten of a resinous character, and heat and moisture operating upon the stalk thus exposed loosen the globules from the boon, which adhere to the lint. Thus all of the gluten which grew in the plant remains in the lint in a decomposed state. This is the reason that tarred cordage has not been, and cannot be successfully used when made of dew-rotted hemp. The snow rotting, so much desired by farmers, is a process between the common dew and water-rotting. The exclusion of the air from the lint by the snow prevents the decomposition of the gluten, and the coloring matter is not formed except by the free access of air to the stalk. The alternate freezing and thawing of the stalk serve to disengage the lint, as in the process of dew-rotting.

It is the general opinion that snow is an excellent rotter, as also is alternate freezing and thawing weather, such as is generally seen from late January to March, often called sugar weather. Rotting in mid-winter is slower, however, than the drizzly fall rains, and one must weigh the good and bad in each method, and decide whether he wants quick or slow rotting. In the one case he will spread early in November; in the other, after Christmas. If the rotting is too long delayed, a few warm rains in April are said to play havoc with the weight and quality of the lint.

The time to take up hemp can be known only by examining it. The middle of the stalk tends to rot faster than either end, with the result that when well rotted and dry, some stalks show a tendency to bow-string. In drying, the threads contract; and being loose in the middle, yet fast at the ends, the stalk is bent into the shape of a strung bow. When this phenomenon is

[1] *Patent Office Report* for 1845.

observed another test is applied. If the dry butt snaps off clean, and the lint strips off without curling, it is ready to break. Still, the most satisfactory test is to try some hemp on the brake and see how it cleans.

The rotting is very important, and is carefully looked to. Up to a certain point the fiber itself is not affected by the rotting process; but after that the hemp is said to lose weight and quality very fast. Though most hemp dealers deny that tender hemp can ever get strong again, there is some evidence that it will. A manufacturer[1] once had some hemp brought to him, which had overrotted until it would tear like grass. He bought it as tow; but considering it as worthless, it was left for a year or more in the corner of the warehouse. Being out of hemp, one day, and wishing to keep his men busy, he got out this tender hemp and found it so good that he looked up the farmer and paid him the market price for good hemp. He afterwards experimented on other overrotted lots with the same success. Whether or not it actually gains strength and weight, it certainly improves in softness and general appearance by storage.

The breaking requires considerable skill, as well as strength, and greater skill will outweight any amount of strength. Whereas 150 pounds are thought a good average day's breaking, some Negroes can break 500 or 600 pounds in a day, and one man claims to be able to break 100 pounds in an hour. The largest breaking of which the writer has heard was 640 pounds in one day.[2] Mr. Evans suspected fraud in this case, but could not detect it, and paid the prize. This man had often broken 400 pounds a day for him. Were the skill which makes this possible generally known, it would largely increase hemp production, without necessarily lowering the wages of the breakers; but unfortunately the men who possess this sleight carefully guard their secret, from superstition, selfishness or short-sighted economy. They either will not or cannot teach it even to their

[1] *Pat. Off. Rep.* for 1844.
[2] *Cf.* Mr. R. G. Evans, Danville, Ky.

own children. The general and customary price for breaking has been one dollar a hundred from time out of mind. During the long panic of the nineties it fell to eighty cents, but has since been restored to a dollar. Under the slavery system it was generally calculated at about sixty cents a hundred, although, of course, the cost was not computed on the hundred basis, but depended upon management. At present, owing to a scarcity and uncertainty of labor, great efforts are being made to substitute machine labor in breaking, and a number of experimental machines are running or building in the state. Their attention is mainly concentrated upon working up unrotted hemp. The results are very satisfactory as to weight and strength, but they have not yet been able to clean it at a profit.

The final yield is something that cannot even be guessed at until some of the hemp has been broken out and weighed. Since the product is paid for by weight, weight is the chief end of the planter's exertions; but the determinants of weight in hemp are, as yet, wrapped in mystery. Of two kinds of hemp, otherwise alike, one may weigh nearly twice as much as the other. It is not known whether all would weigh the same if treated in the same way, or whether the seed, ground, time and amount of sowing, season, differences in ripeness, conditions of curing, time of spreading, or conditions of rotting, and so forth, have most influence in determining the final yield and quality. Holding both production and consumption in mind, the weight would, of course, be immaterial; but as we are here more interested in the producers, the subject of weight should be the most important in our study. It has been said that the yield per acre will be one hundred pounds for each foot in height of the standing hemp;[1] but this is no sure guide. Of two adjoining fields in the same season, one of them six to seven feet high, the other eleven or twelve feet, the six-foot field outyielded the twelve-foot one.[2] We might possibly get a clue to the determinants of weight and

[1] *Memorial of the Legislature to the Congress in* 1842.
[2] Mr. Lewis Johnston, Woodford county.

value, (1) through a study of the conditions under which extraordinary yields have been produced, and noting in what points they all agree; (2) through a study of methods of rotting other than spreading on the ground to be weather-beaten; (3) through a study of the plant itself, chemical and botanical. These studies, however, properly belong to the next chapter.

After the hemp is broken, the grower passes it on to the dealer, who hackles and grades it. The hackling process requires practically no capital, the work being done almost wholly by hand, and requiring not so much skill as main strength. It is no more difficult than breaking, and there seems to be no good reason why the hackling should not be done by the grower, as is the case in Russia. There would be no especial advantage in this except that the country Negroes ought to be able to work more cheaply than those in town. There would be little saving in freight to the grower; but during most of the winter hemp breaking is the only work to be done, and if the hemp could all be broken out early, the country Negroes could apply the rest of the season to the hackling. High-capacity power brakes would materially shorten the breaking season, enabling the country workmen to do the hackling, and the towns to carry on the finer branches of assorting and manufacturing. It ought not to be a hard task to devise a machine which would do most of the heavy work of hackling. When hemp is made into flax lengths it is hackled by machinery; but the reason is not so much that the machine hackling is cheaper, as that the workmen will not handle flax lengths. The hackling machines are quite expensive, and of small capacity, although they do their work well. A machine will take in about a ton of hemp per day, turning out from this about seven hundred pounds of dressed hemp, ready for spinning as flax. For this purpose the long hemp is first broken apart into three-foot lengths on a machine. A good workman can thus handle a ton a day, at ten cents per hundredweight. Most of the hemp, however, is hackled long, baled and shipped to the manufacturer. Good workmen can hackle varying amounts, depending upon the fineness of the dressing. The coarsest hackle

is called the "topper." One Negro has been known to put over seven hundred pounds through this in a day.[1] The grade hackle produces single-dressed hemp. The record on this is three hundred pounds.[1] Double-dressed hemp is put through a still finer toothed hackle. The finest hackle, the "mummy," is used only to split the ends. The hemp may or may not be softened before hackling.

The cost of hackling depends on the amount of dressing, and also varies from time to time. Single-dressed generally costs about $0.90, and double dressed about $1.25 per hundredweight. The dressers get nothing for the tow that is left.

The hemp which is received by the dealers is graded according to length, as above mentioned, and also according to quality, always subject to order. Cleared hemp is that which receives the least amount of work. A long ton (2240 pounds) of good hemp yields about 1900 pounds of cleared, 1700 pounds of open-cut (next grade), 1500 pounds of single-dressed long, and about 1100 pounds of double-dressed long. Double-dressed grades into "long" and "short." The longer the lint, of course, the more valuable it is; accordingly, the dealers will work in as much "short" of a grade as the market will stand. Very particular buyers will order "D. D. long, free of shorts." Shorts are always double-dressed. Speaking roughly, a ton of good hemp will yield about one-half of No. 1 double-dressed long line, the remainder yielding about equal proportions of shorts and tow, though the proportions vary according to the strength of the hemp. The absolute loss from such a ton will vary. The wholesaler will lose nearly two per cent. of the weight of all hemp handled, just from the dust and herds that fly out while examining each hand. The best undressed hemp will have some dust and specks of mud clinging to it, all of which come off in the hackling. Some of the lint, too, floats off into the air as an impalpable down. The softening process will release still more dust from the friable dried gum and scurf on the lint. Beyond these, however, there is no certain loss, since every bit of the tow

[1]Ben Warfield, Lexington.

can be used for something. Though it is not certain that hemp will actually gain weight and strength from storage, it certainly loses none, and will always gain in quality or softness, and in general appearance. The topmost bales in a warehouse may sometimes lose some weight, but this is about compensated by the gain in those at the bottom. There is an undoubted gain in value on the whole bulk, from storing, which is considered by some[1] to pay more than the cost of storage, insurance and interest.

The weight of a bale varies with the quality and grade. The presses are not all of the same size, but are nearly so, making the bales about 4x3x2 feet. Double-dressed hemp weighs about 900 pounds to the bale, while single-dressed weighs 800, and tow about 450 to the bale.

The bales are not pressed as tight as they might be. A bale of undressed hemp which now weighs about 600 pounds could be made to hold 1000 pounds,[2] which ought to reduce the cost of freight considerably. Hemp is not very elastic in the bale, so that it is easy to tie. If it is to be sent by rail only, it need not be covered. If it goes by rail and water, the ends must be capped. If it is to be sent to any of the Atlantic ports, as New York or Boston, it is cheaper to send it by rail to Newport News, and ship thence by water. Little or none seems to be shipped by rivers, now. Freight rates to New York and Boston have been about the same for twelve or fifteen years, running between six and seven dollars a ton. Undressed hemp is now worth about one hundred and fifteen dollars a ton in New York and Boston, where most of the Kentucky hemp goes. The dealer makes a slight saving in freight by first dressing it, and also avails himself of the cheaper labor here. Were it not for the fact that dressing and shipping are always done according to order, the farmer would have the same advantages over the wholesale dealer.

For a long time the great bulk of the hemp has been

[1]Mr. John Yellman, Lexington.
[2]Mr. C. P. Rogers, Lexington.

exported from the state, going mainly to New York and Boston, where most of it is made into carpet yarn, selling from sixteen to eighteen cents a pound. A good deal is sold as flax, as has been said. Last year (1903) large quantities were sent to a Chicago firm in competition with sisal, in consequence of the operations of the sisal trust. The same firm[1] is now experimenting in Kentucky with unrotted hemp, broken out by machinery. Although such hemp cannot be classed as soft fiber, it is said to make good binder twine, being of excellent strength and weight and clean of scurf. The yield per acre is said to be twice as great as from rotted hemp, and as it is much stronger than sisal, it yields more feet to the pound than does sisal. If the power-brake should prove successful, it is thought that unrotted hemp can be put in Chicago at four and a half cents a pound, at which price it would compete with sisal. About 125,000 tons of harvester twine are made in the United States every year, but very little of this is hempen. It is a high ambition indeed to capture such a market, but four and one-half cents a pound would capture it. At present, the cost of breaking unrotted hemp is prohibitive.

The manufacture of hemp has nearly disappeared from the state. A great deal of fine commercial wrapping twine and some harvester twine are made in Frankfort. None but good hemp is used in these, it seems, the mills buying direct from the grower. This saving of freight, together with the good quality of their raw material and product, enable them to make binder twine profitably, when twine prices are fair. The margin of profit, however, seems to be very narrow. One hundred pounds of best undressed hemp will yield about seventy five pounds of binder twine, while it is claimed that one hundred pounds of sisal will yield one hundred and five pounds of binder twine, owing to the dressing put on it. Most of the Frankfort binder twine is three-ply, which seems to give the best results, although it seems

[1]International Harvester Co., of Chicago.

to be needlessly strong. The proprietor showed the writer some single-cord binder twine which he had made as an experiment. This twine ran 700 feet to the pound, and bore 108 pounds strain when tied with the regular reaper knot. The chief trouble with it was that it tended to untwist, on being drawn from the ball. It costs less to make the single than the three-cord twine. On the whole, however, the making of binder twine from good hemp requires close business cutting. It is said[1] that more profit can be made in binder twine from using sisal at seven cents per pound, than from hemp at five cents. The Frankfort mills employ both women and men, and white and black labor. Negroes are used only in the rougher parts of the work. The greater cheapness of the labor employed in these mills may be balanced by a great efficiency of the foreign labor. The use of good hemp, instead of tow, which is always used for binder twine elsewhere, enables them to make a longer and stronger twine, weight for weight, than elsewhere. They would have a decided advantage in being at the place of production of the raw material, were it not for unequal railroad rates, and the fact that their produce must be largely sent to New York for distribution even to the western markets.

[1]Mr. Chas. P .Rogers, Lexington.

CHAPTER III.

A Study of the Economic Possibilities of the Industry.

In dealing with possibilities, however interesting and important they may be, one can hardly be too careful. The matter would not be taken up here, except for the fact that certain points and certain conclusions arise and force themselves upon us, and yet could not well be treated elsewhere. One or two suggestions might also be pardoned, supposing that they have not already occurred to the reader. We have now some little knowledge of the vicissitudes in the hemp industry—of the things which have been done on a small scale, and one can not help speculating as to the result, if those things could be repeated on a scale proportionate to the general improvement in business since this time. Changes in the popular demand do not fully explain the phenomena which we have witnessed, in regard to the market and uses for hemp, and many things seem to indicate that some parts of the great fluctuations and variations in the hemp industry have been due to disturbances at what we call the root of the industry, and also to one very weak point in hemp production; namely, the breaking.

As regards the trouble at the root of the industry, one can not fail to notice that hemp has throughout been a fair indicator of the general prosperity of the commonwealth, reflecting all the great social, economic and political changes and disturbances. Being thus forced to believe that an intimate connection exists between hemp and the wider business world, we should and would begin our present study of possibilities, by studying the general, social and industrial conditions of Kentucky, were not such a study beyond the scope of our present work. Were we to attempt such a digression, we would very soon find ourselves called upon to attack the problem of prosperity itself. Such a

thing is clearly beyond our subject, however needful the task may be. The health of the social body is more or less necessary to the health of the industries which grow in it. If there is really anything wrong with the social health in the case at hand, its study and remedy do not come in here. It would seem that even the particular mechanical difficulty, of which we just spoke, might finally have to yield, if a concerted and determined effort were made upon it. Whether such an effort be worth while remains for business men to decide. If other employments are, and continue to be more profitable than hemp growing, it would be idle to pursue the industry or the subject any further; but the fact remains, that even in the face of the present mechanical difficulties, wherever labor can be obtained of a tolerable quality and with a reasonable amount of trouble and wages, hemp is still accounted the second most profitable crop in central Kentucky, whenever the price reaches anywhere near five cents a pound. It is a moot point with some, whether, at five cents, it is not even now the most profitable crop in that country, in the long run. Five cents, however, would seem to be above the normal price per pound, as the market will not ordinarily take much at that price. The market is generally willing to give four cents, though it has sometimes been glutted at that price. For more than a hundred years, short crops have averaged slightly more than five cents, while full crops have seldom brought more than four cents a pound. The market will take almost any amount at four cents, and the grower is willing to furnish any amount at five cents. The planter sows, hoping for more than four cents, and none would sow if they knew that only four cents would be offered. The productivity of fresh or clovered Blue Grass land is such, that a certain and unlimited market for hemp at four and a half cents a pound would probably tempt most owners of high class land to go into hemp growing. This is not a very good return from land at $100.00 an acre, when one must take his chances with the weather, and must brave the uncertainty and high wages of farm labor now. Until the price falls below four and one-half cents, it is almost impossible to break through the customary

price of a dollar a hundred for breaking, and three dollars an acre for cutting by hand. Though not formally "unionized," the whole body of Negro workmen really forms one of the strongest labor unions ever known. They form an extremely immobile labor class. Though they migrate freely from farm to farm, yet their migrations seldom take them as much as ten miles from their birthplace. They seldom or never underbid each other; and as they have no particular standard of living, and no particular code of morals, they have no fears of being out of work. Almost every one of them belongs to a church, and also to a "society," the "societies" forming an organized whole throughout a large district. These Societies have never been specially studied, and the color line enables them to maintain a strict secrecy and unanimity in all their dealings. Whether these Societies really declare strikes and fix wages, as some think, can not be certainly known; but if they do, their operations are so quiet and widespread that they have hitherto baffled the white man. That grower is most successful, who best understands the sociability and childishness which characterize the race. It was through such an understanding, that Negro slavery was not only made possible and very profitable to the white people, but even delightful to the Negroes in the South. Gathered together in large numbers on the plantations, and relieved of all responsibility, by the white man, they rose constantly in their own estimation, and seemed to have enjoyed working together for their masters. The estrangement which was so zealously fostered later, seems never to have gone very deep, and it is believd by Southern writers[1] that the large farm or plantation would be as successful now as it was under slavery, if the planters studied the Negroes as carefully as the founders of the South did. One often hears it said that Negroes love to work in gangs, and a little tact, a drop of whisky, or a small prize offered will generally increase their productivity out of all proportion to the actual outlay. The Negro is eminently romantic, and is quickly touched by things which would not appeal to the white laborer, or might even antagonize him.

[1]E. M. Banks, *Land Tenure in Georgia.*

These things are only mentioned because hemp culture is so peculiarly a matter of hand work, and because we are dependent upon the Negroes for labor in it. The planter must study the soil, the weather, the markets, and a host of other things. He must even study his work-stock. Is it not fully as important to study his workmen? He is really no more dependent upon the Negroes under the free system than he was under slavery. Had they not been studied and humored then, they would probably have sulked, or fretted and died, as one would reasonably expect any man to do in slavery. Instead, they increased in body and mind and happiness, even when they were adding most to the comfort of the white man. It was not slavery so much as good management, that did the wonders which are often ascribed to slavery. As for the Negro Societies which now exist, the effectiveness of the "grape-vine telegraph" would seem to indicate that the Negro race was as thoroughly organized and at one in spirit under slavery, as they are to-day.

As for the market for hemp, leaving out the question of price for the moment, the demand is not so great relatively, perhaps, but absolutely, it is enormously greater than it ever was before. One must by no means think that the whole fiber market is open to hemp, though there is probably no fibrous article which has not at some time been made of it, with a gain, in most cases, in the general fitness of the goods. Wool has a warmth peculiar to itself, and the softness and sheen of silk might not be imitated exactly. Where stiffness and weight are no objection, the hard fibers answer well enough in cordage, and perhaps resist the weather better than hemp; but aside from these, there is a market for hemp which is practically unlimited, or, at least, which is greater than we could ever fill. The only question, then, is one of cheapness of production.

In the matter of production we have seen that there are striking advantages and disadvantages. We have learned that hemp, while requiring a large store of food, yet draws very lightly upon this, under the system of restoring all the waste to the soil whence it came. We believe that with careful husbandry

the chief cost of hemp culture would be in stocking the soil with the necessary food, as it will then continue to produce for many years without further feeding. Through a very careful study of hemp feeding,[1] we know the kinds and amount of plant food which are needed to supply the crop, so that this point has become little more than a simple matter of arithmetic. We have a thousand square miles of ground which need little more than clovering to fit them for continuous and profitable hemp-growing. Thus, with the best farming and good feeding, this ground alone might yield two or three hundred times as much hemp as it has done, were there no other difficulties in the way. It will be found, however, that the stumbling block is not one of soil, but lies in handling the grown crop.

In handling the grown crop we have been forced to rely almost wholly upon hand labor, which is costly and limited. The ancient system of forced labor seems to have been better than the present one only in the element of certainty. Sowing and reaping have lately yielded to machinery, but the breaking has hitherto baffled all attemps in this line. The rent of the ground and the breaking out the crop are each calculated at about one cent per pound on the final crop. The other expenses, which are constant, are reckoned at about twelve dollars an acre. To increase the certainty, the crop is occasionally sold before sowing. The one item of breaking is thus found to make up about one third of the cost of the average crop, and the ratio increases with the yield. Thus, an acre's crop of 1000 pounds at four cents will yield a rent of about ten dollars, and a tenant's profit of about eight dollars, the fixed expenses being about twelve dollars. A 1200 pound crop at four cents yields about twelve dollars rent, and twelve dollars to the grower.

A 1500 pound crop at four cents yields about twelve dollars rent, and twenty dollars to the grower.

A 2000 pound crop at four cents, yields about fifteen dollars rent, and thirty-three dollars to the grower.

[1]Made by Mr. C. C. Moore, Washington, D. C., Dpt. of Agricul'e.

The cost of raising the largest and smallest crops is the same, or about twelve dollars an acre. Of course, a yield of 2000 pounds an acre is very rare, though not unheard of; but on the other hand, the price is generally above four cents, while the rent does not rise proportionately. Thus the striking increase in the tenant's gains from larger crops will be about as shown. A crop of 700 pounds an acre, at four cents must pay about eight dollars rent, while the tenant can hardly make anything. Beginning at 800 pounds at four cents and increasing the yield 100 pounds at a time, the tenant's gains will increase somewhat like this: $3, $8, $10, $12, $14, $16, $18, $21, $24, $27, $30, until a crop of 2000 pounds an acre at four cents will yield the grower over $30, as the rent will seldom rise above $15 an acre, regardless of yield. If the price be five cents a pound, the tenant's gains will rise about like this, beginning with 800 pounds an acre: $10, $14, $17, $20, $23, $26, $29, $33, $37, $41, $45, $49, being $53 from a yield of 2000 pounds at five cents. With a further rise in price, the tenant's gains will rise much more rapidly, unless the landlord put on the screws. Of course, if the price rises very high and remains so for quite a while, as during the civil war, rents will also rise; but on the other hand, if it remain at four cents or under for some years, the cost of breaking will fall.

The figures given above are but a rough approximation, since custom and ability to drive a good bargain both influence the calculations. Thus, rent is fixed in advance by an estimate, conscious or unconscious, of the next year's yield, and it does not increase steadily.

The normal price of hemp seems to waver about four and one-half cents. On good soil it is profitable at this, under our present system. This price, however, is above that of some of the baser fibers which compete with hemp in most lines. A suitable machine ought to break it out for about half a cent a pound, which should make it possible to put hemp on the market for four cents a pound. A successful fertilizer might accomplish the same result, or make it possible to sell at a profit for slightly

under four cents. At this price it should be possible to sell all that can be grown.

The fertilizer problem seems in a fair way to be solved, but the breaking-machine question is almost as much of a puzzle as ever. It is said that over three hundred of these machines have been patented in the United States, and the interest in them has been revived, of late, owing to the growing scarcity and uncertainty of labor. The writer has seen several machine brakes, and has studied the principles of many others, as found in the Patent Office. They are generally complicated, weak, of small capacity, and liable to cut, tear, and tangle the lint. Since that which is torn or tangled must be sold as tow, this waste is generally prohibitive, unless the capacity is very high. The new Shely machine is built on an original and ingenious design, relieving it of the customary strain, and looks promising. Its capacity ought to be considerable, but the amount of tow made will probably be large, since the stalk is repeatedly broken without first flattening it. Other machines are generally a combination of smooth and fluted rollers, with or without some device to beat or shake out the hurds. Some have an attachment to blow the dust and hurds out, and to prevent the lint wrapping about the rollers. It is generally thought that the hurds will furnish sufficient power, by burning, to drive the machinery, and some machines carry the waste directly to the furnace. The principal faults in all of them are their weakness and small capacity, being generally little more than toys. Some of them flatten and break the stalks, the cleaning being done by hand. When it is thus crushed for him, a good hand ought to clean out five hundred pounds a day, regularly. Even this would largely increase the general output, if the crushing machines were sufficiently large and powerful.

The great need for a successful machine brake is generally and keenly felt, especially by those who till their own ground. The larger the yield, the less will they begrudge the wages of breaking; but society looks upon the cost of breaking as an ever-increasing burden. Thus, with hemp at four cents a pound, and

a yield of 2000 pounds an acre, the single item of breaking by hand will constitute nearly two-thirds of the whole expence of raising and preparing the crop for market. Given a power machine to remove this difficulty, there is no limit to the capacity of the state to produce hemp at three and a half cents a pound.

The need for better methods of rotting is not so intense as that for improvements in breaking. Holding all the facts together in mind, it may be doubted whether we need any immediate improvement over the regular system of weather rotting. No doubt the chemists could find a quick solvent which may be used when the difficulties mentioned above have been overcome, and the market for coarse fibers has been filled. There is an enormous market for linen goods, which might be filled by hemp. If the prices were approximately equal, linen would always be preferred to cotton goods, on account of its sheen, its greater whiteness and far greater strength and durability. On the other hand, cotton will probably always be preferred by manufacturers, as being more tractable in the spinning. The long fiber of hemp seems to lend itself less readily to machine spinning, but its possibilities seem greatly to exceed those of cotton. It is said that two hundred and forty miles of thread have been spun by hand from one pound of hemp,[1] and that the finest laces of the olden days were always made of hemp in preference to flax. We have already seen that in Europe linen used to be labelled "all hemp," as a mark of excellence; that "Flanders fine hemp linen" was sold in Lexington. Herodotus also says that the Thracians made beautiful linen from hemp.[2] What has been done can be done again.

Although it hardly seems practicable to rot hemp otherwise than it is done now, it might be well, in conclusion, to say something of the other methods which have been or are now sometimes practiced.

The rotting of hemp in pure water or in alkaline solutions

[1]S. S. Boyce, *Hemp.*
[2]Herodotus, Book iv.

is a simple task. The writer has tried many such experiments, and has met with uniform success from the first, thus proving the simplicity of the operation. By boiling in strong soap-suds for about fifteen minutes, and then washing with the hands, a perfectly white fiber is immediately obtained. If, after drying, the lint is gently hammered or otherwise crushed, the slight stiffness is taken away, leaving it nearly as soft as silk. In all cases this hammering or mangling seems necessary to give the required softness. Excellent results are obtained by steeping the hemp in scalding water containing potash or other strong alkali. The exact amount of lye needed has not been ascertained, but a chemist could easily determine it. For some reason it seems best not to boil the hemp in the alkaline solution, but to immerse it at scalding heat and steep until the water cools. The lint itself seems not to be injured by long steeping, and yields a beautiful, soft, white and strong fiber, which separates readily from the stalk. Rotting in pure water varies with the temperature of the water. In stagnant or running water at blood heat the rotting is well done in five or six days, in which time lint as fine as the Italian has been produced.[1] Before watering, the bundles should be tied in two or three places to prevent tangling later, and they must be held under the water by force. The odor from it is not objectionable, except when rotting freshly-cut hemp; but it is then intolerable. If the water is about sixty degrees Fahrenheit, the rotting may require two weeks; if ice-cold, it does not seem to rot any faster than winter-spread hemp. If hemp is watered immediately after cutting, it rots readily, and can be made perfectly white simply by washing with soap, and mangling. Ordinarily, water rotted hemp is straw-colored, with a good even strength and weight.

Of the innumerable methods of rotting hemp other than by spreading to the weather, water rotting has always been the most popular. A method between water rotting and weather rotting is described[2] as "dew-rotting." The hemp is spread each

[1] *Cf.* Mr. D. B. Yellman, Lexington.
[2] Putnam's *Cyclopaedia,* "The Useful Arts."

night to catch the dew in summer, and bunched the next morning to keep it wet, the rotting by this method requiring several weeks. It sounds impracticable. In snow rotting the hemp is spread upon the snow, and buried by the next snow storm, so that it lies wrapped in snow until rotted. The resulting lint is said to be very fine, as it does not discolor or mildew, and never touches the ground; but this process seems impossible outside of Russia. A peculiar method of water rotting is thus described by Mr. Jas. Anderson,[1] of Louisville. Steep the hemp in a vat for about twenty-four hours, and then draw off the water. Let it lie in the vat until it heats, which will be between ten and twenty hours. Fill the vat again with water, and let the hemp lie in this until convenient to take it out. It will lie in water for months without injury, and this method produces a heavy and oily hemp, though rather hard to break out by hand. A French process, somewhat similar, is thus briefly described:[2] Put a layer of straw under the hemp in the vat, and also cover it with straw. Let it lie under water for one or two days. Draw off the water, tread the hemp down firmly, then let it lie without water in the vat until sufficiently rotted, not letting the mass heat above one hundred and eighty degrees Fahrenheit. Three or four days are generally long enough to complete the process; and if a little lye be added to the water, the process is hastened. It is said to make a beautiful lint.

The above methods are virtually phases of water rotting. The advantages of water rotting over weathering are said to be very great, although our present market is satisfied with weathered hemp. Myerle[3] says that: "Hemp water-rotted judiciously, and handled properly, will gain from ten to fifteen pounds on the hundred above the dew-rotted, which more than amply pays for the difference of labor or expense in preparation." It is not necessarily stronger than common spread hemp, but being more evenly rotted, it is more homogeneous in strength,

[1] *Pat. Off. Rep.* for 1848.
[2] *Pat. Off. Rep.* for 1845.
[3] *Ibid.*

quality and color. It is also said to hold tar and to resist the elements better than common hemp, and its light color may also give it special uses. Myerle further says that hemp for water rotting should be dried in the shade to save its color and essential oil. When spread to dry after rotting, rain will not hurt it, if it is occasionally turned. "Kentucky hemp, however, possesses greater flexibility than that of the Russian, and can be dressed finer, although the Russian is more equal in length; and while less flexible is preferred when the cordage is to be used for shrouds and stays in the rigging of vessels."[1] The navy department sent to Mr. Myerle the following fact for explanation: "The American water-rotted hemp, when made into cordage without the application of tar, proved to be greater in strength than Russian; and the application of tar proved to depreciate its strength to that of Russian." Myerle's explanation was that the Russian was harvested while still green, and kiln-dried; thus fixing in the lint the essential oil, which enabled it to take more tar. This explanation sounds hollow; moreover, Butowski says that in Russia the hemp is not cut until fully ripe.[2] Saunders says[3] that "Some knowledge is being acquired by the experiment made in the last few years by water-rotting. It has been ascertained that it will not do to water-rot in hot weather—that it must be done in cold weather." "Out of hemp not a particle better than ours, the finest fabrics are now manufactured in France, Germany and Great Britain"[4]

The fibre of the American has the preference in form, from the fact that each particle of strand is a cord of itself; while the Russian resembles a fencing sword—thick in the centre, with their edges; and this will account for the superior strength of many samples of tested American lint. The difference in climate has much to do with the matter. The rotting process in Russia requires several months, from the fact of the water being near a freezing point for this length

[1] *Rep. to U. S. Agricultural Dept.* in 1890.
[2] *Exec. Doc.* 28C., 1S., no. 2.
[3] *Pat. Off. Rep.* for 1845.
[4] *Exec. Doc.* 28C., 1S., no. 2.

of time. The preference for Russian over American hemp, at the present time, arises from the indifferent manner in which the American is cleaned and put up for market, and the absence of the vegetable oil from the lint.[1]

Spon says that stagnant water makes softer hemp, but not so white as running water.[2] He says that it will rot in half the time (four days), if steeped as soon as cut, and that it should be sunned two or three weeks after rotting.

The various methods of chemical rotting may best be treated by a chemist. Many patents have been granted for such processes, and several inadequate studies have been made of this matter. The report of the Commissioner of Agriculture to Congress in 1865 is a long and interesting paper on this subject. The solvents used for the resinous gum which enfolds the lint generally have as their base either alcohol, alkali, soap, or other such substance. Salt water, soda, gasoline and the like seem not to attack the gum. Hot steam has been used, but this is said to weaken and discolor the lint. Citizen Genet has left us a recipe which may serve as a type of the soap processes: Put fifty pounds of hemp in water to cover, heated to two hundred degrees Fahrenheit, and containing one pound of soap. Steep in this two hours. Dry in the shade, and bleach in the sun for five or six days. "By this management it is said that a fourth more of hemp may be obtained than when rotted in the usual way; the hemp is much softer, stronger, of better quality, and the process of cleaning is much less expensive." Ashes or lye can be used instead of the soap, he says. The writer has accumulated a great many additional notes on the chemical rotting of hemp, and numerous recipes and descriptions of processes; but feeling that most of these experiments were rather crude and unscientific, and remembering the more immediate and more urgent needs of the hemp industry, he thought best to leave this particular subject to a specialist.

[1] *Pat. Off. Rep.* for 1845.
[2] *Encyclopedia of Industrial Arts,* &c.

Mention has been frequently made of the possibility of preventing the decay of hemp by treating it with antiseptics. Mr. O. S. Leavitt, of Maysville, says of this:[1]

In Russia, where the hemp straw is immersed for a time in cold water, frequently under ice, fermentation does not take place, the hemp being only submitted to the solvent action of the water; but in this country, when water rotting is attempted, it is either in warm weather, or the water is warmed by artificial means, so as to induce fermentation; and every chemist knows that fermentation is the first step to decay. Another advantage it is plausibly supposed the Russian has over our own is this: The serfs, in breaking it out in their huts in the winter, hang it up where it gets smoked, or it becomes smoked in the drying of the wet straw. The pyroligneous acid unites with the gluten of the hemp, and being a well-known antiseptic, has a tendency to preserve it from decay. The term kyanizing is now applied to all processes for preserving timber and other vegetable matter from decay by the use of antiseptic solutions. This process is named for Mr. J. Kyan, an Englishman, who, many years ago, endeavored to secure the general adoption of his process for the preservation of ship timber. Corrosive sublimate is the material which Mr. Kyan employed for the purpose, but chemistry has shown that other substances can be used with equal advantage, and much less expense; arsenic, and sulphate of iron and copper, and some other substances have been used with more or less advantage by the French chemists, who have taken the lead in this art. Chloride of zinc was successfully used by Burnet, the surgeon in the British navy several years ago, for kyanizing rope yarns, and this is the substance used at Maysville, Kentucky, for kyanizing cordage made of unrotted hemp. It is prepared by dissolving zinc in muriatic acid, and this diluted with water in a large tub to such an extent as to give but a slight alum-like taste to the chloride when placed upon the tongue. The yarns were immersed in the solutions for about twelve hours, drawn out with a heavy reel from the tub to drip for an hour or two, then stretched out to dry. This made the rope almost indestructible from ordinary exposure to the weather. The expense is trifling; the color is but slightly affected, and the rope had the rich yellow color like the Russian cordage, from which it was not easily distinguished. The ropes were used on boats, and daily wet for months without decay; clothes lines hung out for a year, and ropes lay on the ground in damp situations for the same

[1] *Pat. Off Rep.* for 1861.

time without showing any signs of decay. Pieces of rope and bagging prepared in the same manner were placed in dung heaps with like samples made from the common rotted hemp; the latter were as rotten as the dung itself after a few week's exposure, while the kyanized samples were unaffected. It was found in numerous tests, public and private, to be twenty per cent. stronger than the Manilla, wore smoother, and was less liable to fray in snubbing, qualities rendering it superior to Manilla for running rigging. This cordage was found to have a marked advantage over that from rotted hemp when tarred; it was more flexible, and is not liable to what is called "burning." A specimen of bolt rope that had lain two years was found to be as pliable, to all appearances, as when first made.

These experiments seem to have been carried on throughout the first half of the nineteenth century, and many good preservatives such as blue-stone, corrosive sublimate, etc., were found; but the practice seems never to have passed far beyond the experimental stage. It should be a simple problem in chemistry, nowadays, to make a successful antiseptic or preservative for hemp, but several economic difficulties must be removed before this chemical one is reached.

In conclusion there would properly remain to be undertaken a line of work mentioned above; to-wit, a detailed study of the conditions under which the most successful hemp crops have been produced, with the hope of reproducing these in so far as they are within our control. This task was earnestly taken up; but as it is not customary among farmers to keep accurate notes on their growing crops, sufficient data could not be found to give satisfactory results. This part of the subject must, therefore, unfortunately be omitted. The notes of the Kentucky Experiment Station are instructive, but no amount of official experimenting can be as satisfactory as a comparison of the crop notes kept by every intelligent and experienced hemp grower, because it seems fairly well proven that the weak point in the entire industry lies in the later, rather than in the former stages of production.

CONCLUSION.

In conclusion, it might be worth while to glance rapidly at the main drift of events which underlie and surround our subject. Kentucky was the entering wedge in the settlement of the South and West by English-speaking people, and, for two generations, remained the distributing-point for all emigrants to these countries. The pioneers naturally found the most profitable outlet for their energies in land-tillage, leaving practically all other kinds of work to the women. The unusual fertility of the land was such that it was enabled to hold the attention of the best masculine energy throughout the whole formative period of the commonwealth. Thus, farming became considered as pre-eminently man's work, while the women performed the whole duty of clothing the society. This arrangement was so satisfactory that it was in no wise disturbed by the coming of slavery. The Negro men were used in farming, and the women in housework, including spinning and weaving, being fairly serviceable in these things.

By the time all the best lands had been taken up, and the economic adjustment above outlined had been well settled, the close of the Revolutionary War set in motion a great tide of immigration. These more or less wealthy immigrants greatly quickened all forms of industry, and revolutionized the non-agricultural industries by offering a regular market for their goods, and by increasing the supply of artizans and handicrafts-men of all kinds. The attractions of the soil, however, were such that husbandry constantly outran the manufacturing class, raising the wages of tradesmen very high. The impatient farmers wanted to get in direct touch with the world's market through the great rivers. The tradesmen, however, implored a little patience until they could supply the home market with home

manufactures. Spurred by the strong demand for their produce, the tradesmen quickened their energies up to their highest capacity, yet that was not enough. Their inventive genius was taxed to devise all kinds of labor saving machines, but the call was ever for more and better goods than they could turn out. In cloth-making they had to compete with cloth spun and woven as a plantation by-product, by Negro women, under the guidance of their careful mistresses. The factories never did really compete with the household weaving, though we find them very early enabled to spin and furnish hemp thread to the household weavers, more cheaply than it could be made at home. By the time that the tradesmen had improved their machinery to such an extent that they could supply good cloth from their factories, the farmers and merchants had forced the passage of the Mississippi, and had opened up a land-and-water trade with the eastern states. By this time, Kentucky had developed into a typical manufacturing state, as Mr. Clay loved to say;[1] but we probably should not conclude that the total wealth in manufactures of all kinds really compared favorably with the agricultural wealth of the hemp country. This high development of manufacturing industry was probable only a temporary condition brought about by the presence of a large number of artizans of all kinds, who were fleeing from the distress of the war, and the "dumping" policy of England, so keenly felt in the eastern states, and who were held in Kentucky by the high rate of wages and the danger and difficulty in moving to the wild, though free lands beyond the Ohio and Mississippi. The opening of the Mississippi did not bring much immediate change in the industrial situation, because the slight increase in the foreign trade was about offset by British competition in the Louisiana markets, which the Kentucky manufacturers had formerly monopolized. The gradual perfection of the cotton-gin had forever put it out of the power of hemp to compete with cotton, unless a successful machine could be found to break and dress hemp. No such

[1]W. C. Wood, *Henry Clay and the American System.*

machine was found; but the rapid growth of the cotton industry soon offered a considerable market for hemp in bagging and rope for wrapping cotton bales. Capital was probably not over abundant, as the appeals for state aid and the use of lotteries in raising money for factories would indicate. Accordingly, open competition with England in the southern markets was keenly felt, especially as England had a better water route. In consequence of this, the Embargo and non-importation acts, and the second war with England were warmly welcomed by the Kentucky manufacturers, whose spokesman was Henry Clay. It might be too much to say that Clay deliberately brought about these measures to help his constituents, but they certainly had the desired effect. If the "American System" was suggested by Hamilton, it was certainly made possible by Clay; and the nucleus of it was protection to Kentucky hemp.

The invention of the steamboat, first conceived in Kentucky in 1780, developed into a commercial reality on the Western waters between 1810 and 1820, and completely revolutionized conditions throughout the Mississippi and Ohio valleys. Formerly, the swift current of the Mississippi had made it practically impossible to bring anything up the river. Accordingly, the trade circuit was through New Orleans to Richmond, Philadelphia or Baltimore, thence by land and water to Pittsburg, and down the Ohio. The Wilderness road,[1] which was formerly the only route to the East, still bore some little trade in the more precious commodities. The wagon-and-barge trade through Pittsburg was also necessarily small, and could not appreciably relieve the practical monopoly which the home manufacturers held in almost every kind of goods. Consequently, it was not the most progressive, but the most backward branches of manufacture, which set the pace for all other industries. Consequently, while Kentucky, as the head and center of the whole western civilization, continued to flourish, the remainder of the great West shaded off rapidly into barbarism, when one trav-

[1] *The Wilderness Road* by Thos. Speed, Filson Club.

eled a few miles beyond the borders of the state in the year 1810. Sailboats in plenty had been used for many years with some little success on the broad and comparatively sluggish Ohio, but could make no headway on the Mississippi. The next year (1811) a first class steamer was built on the Mississippi, and the experiment rapidly developed into a line of steamers which mastered the current of the Mississippi, and opened a direct and constant trade with New Orleans and all points on the great rivers. Another line was soon opened between Louisville and Havana, Cuba, and tramp steamers soon had all the world before them. New Orleans became the great *entrepot* of the West and South, and continued to be until the railroad system again revolutionized business, and laid down new trade routes.

Up to the time that steam navigation became practicable, the home manufacturers, as was said, had a practical monopoly in Kentucky, which was pleasant enough for them, but which seriously checked the development of the state at large. Whereas the most unthrifty branches of manufacture then held back all others, the destruction of this monopoly by the steamboat made possible a competition which admitted of specialization, and allowed the most progressive, instead of the most sluggish trades to set the general industrial pace. There was, of course, no little distress felt while the unfittest industries were being weeded out, but the politicians hastened to relieve the situation to some extent by tariffs.

Another immediate effect of the steamboat was to remove the barriers to emigration into the free lands to the southwest and northwest. These countries rapidly grew into thriving states. This rapid emigration, which set in strongly about 1820, lowered the price of farm produce, and probably raised the wages of artizans and factory hands, wherever Negroes could not be employed. The rise in wages no doubt temporarily distressed the factory owners, though the capitalist-machinery system was not yet so thoroughly established at it soon became. On the other hand, this emigration opened up new markets all along both

banks of the Ohio, Mississippi, and Missouri rivers. The call for tariff protection, which grew stronger and stronger until the high tariffs of 1828 were granted, does not necessarily prove that the distress was becoming more keenly felt. The tariff of 1828 might really have been caused by a very great prosperity and a temporary supremacy of the manufacturing class over the others. The fact remains that the state continued to thrive so greatly, that many would place the most flourishing period in the general history of Kentucky in the comparatively free-trade years between 1835 and the outbreak of the Civil War. Even within this period they consider as brightest those years between the Mexican War and the panic of 1857, when there was almost absolutely free trade with the whole world.

So much for the general economic conditions; and now for a few words upon our proper subject. Though repeated and earnest efforts have been made in Kentucky to grow the various fibers, particularly cotton, silk, wool, flax and hemp, hemp has always yielded the best returns. In the extreme western part considerable cotton is raised, and the hill counties produce much wool. Silk never got far beyond the experimental stage, though it created a great deal of interest. Some inferior cotton was formerly grown in the central part of the state, and a few sheep are raised there as a by-product or "save-all." Every generation, too, has had to satisfy itself that flax-culture is not profitable on the valuable grass lands. The Blue Grass land is too valuable to give up to sheep, and it it the common experience that this soil will produce about three times as much hemp as it will of flax, while flax brings no better price than hemp of the same quality. With the possible exception of tobacco, hemp culture seems to be the least amenable of all farm produce to the law of decreasing returns. This advantage was very much greater before the discovery of Burley tobacco. A very little experience showed the early settlers that the good climate and wonderfully fertile soil of central Kentucky would produce a larger return for their labor in the shape of hemp than in any other commodity. A little experience with the lint also taught them that it would meet all

their fibrous needs, except in the matter of warm clothing, where wool alone would answer.

We first hear of hemp being cultivated in 1775. Within ten years it had not only become the staple fiber, but had become the standard commodity, or medium of exchange, being used as currency in every kind of business dealings. The home market was filled, hemp became the most important industry in the state, and the merchants began seeking other markets in Pittsburg and New Orleans, the only places open to them.

In 1775, as was said, spinning and weaving were still considered as branches of housekeeping, and woman's work, and remained so until after the Revolutionary War, and the great immigration which followed. The economic plane of cleavage, which gave all outdoor work to the men and all indoor work to the women, has never quite disappeared. As long as Kentucky lay directly in the path of emigration, the artizans, who always lag behind in such movements, preferred to stay in Kentucky until a better opening was found elsewhere. When Ohio, instead of Kentucky, became the distributing point, some fifty years later, the center of general industry tended to move across the river. The hemp industry, however, was a notable exception to the general drift of manufactures across the Ohio, probably because Negroes could be largely employed in making the rough bagging and cordage which were wanted in the southern market. This market was held to the last, as long as hemp was used in bagging. While hemp manufacture was of general importance, Kentucky almost always stood first in this, whether the article was cloth, carpet, cordage, canvas, paper, or any other fibrous goods. In the production of the raw material, Kentucky has, for more than a century, not only led all the other states in an ever-increasing ratio, but for a generation has raised practically all the hemp grown in North America. Though the industry has been subject to tremendous vicissitudes of fortune, it seems to furnish conclusive proof that Kentucky is the natural home of hemp culture and manufacture, and that it is still waiting and seeking for any market that should anywhere arise. Mr. Clay

felt this to be true, and knew that in his youth, just before the invention of the cotton-gin, hemp had been the most important industry of the state. Being a better poltician than an economist, he seemed not to understand fully that this invention at once made hemp dependent upon cotton, and believed that by tariffs he could restore hemp to its ancient supremacy without dragging general industry down to its ancient low level. The age of machinery had set in, and at all important stages, cotton yielded itself readily to machinery, while hemp would not, and was consequently abandoned. An acre of ground will produce two or three times as much hemp as of flax or cotton, and the authorities say that it is much better for all the purposes to which cotton and flax are now put. In cloth making it offers greater possibilities of whiteness, fineness of texture, softness and durability than any known fiber. In fine cordage, its great strength and softness have never been equalled. Henry Clay knew all these things, and believed that by abolishing slavery, and by raising a prohibitive tariff, the only impediments in the way of the hemp industry would be removed. Though a farmer himself, he always directly favored the manufacing class. Hoping to bring back the former state of things, when Kentucky produced everything that it consumed, he forgot that the pioneer public generally regarded this commercial isolation as anything but a blessing, and had only made a virtue of necessity. Here was Mr. Clay carefully blocking the mouth of the Mississippi, which it had taken the frantic efforts of the pioneers twenty-five years to open. In the name of Kentucky he said to the cotton planters, in his own seductive way, that they must buy his bagging and rope, or none. To the ship-builders of Boston and Baltimore he said the same of his hemp. The same law was laid upon the United States Navy, always at the instigation of the Kentucky hemp manufacturers. The competition with Scotch rope and bagging in the few years around 1820 was certainly severe, and the advantages were about the same on both sides; but the Kentucky manufacturers always led in the underbidding, and had practically driven the Scotch bagging out of the market before the tariffs of 1824

and 1828 were put on it. We can not discuss tariffs here, except to agree with Thorold Rogers,[1] that "The favors of government are like the box of Pandora, with this important difference, that they rarely leave hope at the bottom." The tariffs of 1824 and 1828 proved to be direct blows at the New England ship-building, and acted as export duties upon southern cotton. New England thereupon took to cotton spinning, and thus got the full benefit of the tariff, incidentally cutting off a formerly good market for Kentucky hemp. South Carolina refused to quit growing cotton, and rejected the "Tariff of Abominations," which was withdrawn just in time to avert a crisis. For twenty-five years little more was heard of tariffs, while the cotton industry, and through it the hemp industry in Kentucky throve as they had never done before. Clay's policy temporarily raised Kentucky to a kind of supremacy over the other states—a supremacy dearly bought. It drew together the whole of the Ohio valley, including Pennsylvania, but estranged and angered practically everybody else. Massachusetts and South Carolina, with their respective followings, united to put it down until Massachusetts turned to cotton-spinning, seeing that the tariff policy would give her an unfair advantage in her competition with England. To relieve the hemp manufacturers of Kentucky from the necessity of relying upon their wits for a living, Mr. Clay set in motion this dangerous thing which has created dissension and bitter feeling ever since. It remains to be proven whether it ever created anything else.

We noticed a dread felt by the pioneer manufacturers that they would be "overwhelmed by the immense capitals" of their competitors in Great Britain, as well as by the greater cheapness of the foreign labor. The reasonableness of their fears on the former point might well be questioned; but when they tell us almost in the same breath that most of the work of hemp manufacture could be done by Negroes, we must conclude that they regarded slave labor as dearer than the free white labor of

[1] *Economic Interpretation of History*, p. 378.

England. The expression of this dread also indicates that in 1802, when this was written, capitalistic manufacture had practically displaced the old handicraft system. Though the commonwealth practically began in 1774 without any capital, it is thus seen that the Industrial Revolution was far advanced, or practically complete by the end of the century. This is probably as remarkable a display of energy as any recorded in economic history.

For the statistics of hemp manufacture, we are practically limited to the returns of the federal census, given here in Appendix 5. The census figures are very fragmentary, often conflicting, and perhaps open to other charges. With so very rapid a development as we have been witnessing, the ten-year period would, at best, give us a very inadequate idea of what was going on in the business world. When they failed to give any account of the manufactures, as sometimes happened, we are apt to lose our bearings completely. The returns do, however, tell us some things in a rough way. For instance, beginning with 1810, they not only show us how the capitalist movement choked out the smaller cordage and bagging plants, and gradually drew the others together into solid, centralized groups, but they also show us how these two branches of manufacture were divided, the cordage industry drifting to the river towns, while the bagging industry held its ground in central Kentucky, until the competition of jute, or the growth of the railway system, which made the cost of double freightage secondary to other business considerations, finally drew even this branch of the industry to the river towns, or destroyed it altogether. One reason for this geographical distribution may possibly have been due to the fact that the manufacture of bagging always required much greater capital than that of cordage. Central Kentucky being the oldest and always the wealthiest part of the state, the bagging factories were naturally massed there, though Louisville, Maysville, and later on, Covington were able to compete in cordage-making. Louisville was the only river town that ever competed seriously with the Blue Grass country in making bagging; but the great growth

of that city, following upon the break-up of the slave system, ultimately led to its absorbing what little there remained of the bagging industry, while the remnants of the cordage manufacture showed a tendency to drift back again toward the center of the state.

As for the state at large, the only serious competitor in bagging was Missouri, owing to the massing of capital in St. Louis, following the war. In cordage-making, Massachusetts was always a serious, and generally a successful competitor, especially before the tariff manipulation began. Maryland ranked next to Massachusetts. When high tariffs on ship-building supplies helped to destroy the ship building in these states, Kentucky was left with a practical monopoly in cordage-making. During the forties New York made an effort to break this monopoly. During the fifties Massachusetts again rose to first place, which she held until the seventies, when New York again took first place in cordage manufacture, probably owing to the substitution of jute and Manila for the cheaper grades of hemp. Being the distributing point for all imported fibers, New York thus had an advantage over all factories using these fibers.

In the production of the raw material (Appendix 4), we find that in 1810 Kentucky was the only state in which it was considered worth while to give the returns. For this year 5,755 tons of hemp were reported, nearly all coming from the central counties. No returns were given in 1820 and 1830. In 1840 flax was given in with hemp; but the schedules for this year were too untrustworthy to justify our building anything upon them. So many commercial changes had taken place in the preceding thirty years; there had been so many tariff changes, wars and panics and inventions, that the figures for 1840 would tell us little of the condition of the industry, even if we could believe them. The figures given for Virginia are absurdly large, and those for Missouri are almost certainly false. The various estimates for Kentucky are conflicting, though 10,000 tons may not have been far from the truth, owing to the two panics and the cholera in the few preceding years, or possibly owing to a bad

season. We have reason to believe this was far below the average crop in those years, because in 1818 there had been 14,000 tons of hemp manufactured in Lexington alone, and the very high tariffs of the later twenties and early thirties must certainly have increased the production, even though these tariffs injured the market for hemp in outfitting ships. Throughout the forties, also, the crop generally ranged about 20,000 tons, being 17,787 tons in 1850, and reaching the maximum yield, so far as we know, in 1860, when it was about 40,000 tons. It was probably higher than this just before the panic of 1857, though we have no certain knowledge of it. These large and fairly constant yields during the forties and fifties, moreover, seem not to have been caused by high prices, because the quotations were generally about four cents a pound, and sometimes fell below three cents without lessening the supply. This normally large and rapidly increasing production during the forty years from 1820 to 1860 can not be attributed to the tariffs, which were variable, and lessening through most of the time; and as Chinese seed were not brought in until the later fifties, the gradual increase must have been owing to permanent improvements in the culture and economy of production. Hemp culture and the preparation of the fiber for market were studied as a science during the forties and fifties, though the manufacture of it seems to have been best studied in the few decades before that. When one remembers the high average yield during the forties and fifties, it is interesting to speculate on the proportions which the hemp industry might have assumed, had not the war come just then. As it was, the decline of the industry was rapid, both relatively and absolutely. The absolute yield now is about what it was a hundred years ago; but relatively, the market is perhaps not a thousandth part of what it was at that time. Hemp culture has also narrowed in geographical extent, until it is now confined to the exceptionally fertile soil which rests upon the single bed of limestone called the Lexington outcrop. Outside the state the only serious rival in hemp-growing was Missouri, but they also dropped out of the race thirty years ago. Since then none has been grown within the Union, except an occasional crop somewhere for experiment.

APPENDIX I.

Table of Import Duties on Hemp, Hemp Cordage and Hemp Bagging

	HEMP.		CORDAGE, PER LB.		
YEAR.	PER TON.	PER CENT.	UNTARRED.	TARRED.	BAGGING PER YD.
1789		$ 60	$ 90	$ 75	
1790		54	1 50	1 00	
1792		1 00	2 25	1 80	
1797		1 00	2 50	2 00	
1812		2 00	5 00	4 00	
1816		1 50	4 00	3 00	
1824	$ 35		5 00	4 00	.0375
1828	45		5 00	4 00	.045
1830	50		5 00	4 00	.05
1832	60	(lowered to $40)	5 00	4 00	.035
1842	40		4 50	5 00	.04
1846		30 per cent. ad val.	25 per cent.	25 per cent.	25 per cent.
1857		24 per cent. ad val.	19 per cent.	19 per cent.	19 per cent.
1861	40		3 00	2 50	
1862	40		3 50	2 75	
1864	40		3 50	3 00	
1874	40			3 00	2c lb. (under 8c yd.)
1883	40			3 00	1.5c lb. (under 8c yd.)
1890	50	(dressed) & $25 (rough)		3 00	Binder Twine, 7.1c lb.
1894		(dressed, 1c lb. rough-free)	cordage-10 per cent.		All Twine, free.
1897	40	(dressed), rough-$20	all cordage- 2c lb.		Bagging, 006 lb.

APPENDIX 2

Hemp Patents Issued to Kentuckians

Spinning Machine	Nathaniel Foster	Fleming County	June 28, 1809.
Breaking Machine	N. P. Robinson	Fleming County	August 31, 1810.
Breaking Machine	Edward Rumsey	Christian County	April 26, 1811.
Breaking Machine	J. C. Johnson	Fayette County	May 16, 1811.
Breaking Machine	Robert Miller	Fayette County	July 13, 1811.
Breaking Machine	Thomas Pullen	Fayette County	June 20, 1816.
Rotting by Steam	Achilles Chinn	Harrison County	December 28, 1825.
Bagging Machine	John C. Dewes	Mason County	December 28, 1827.
Breaking Machine	J. S. Van de Graaf	Scott County	May 12, 1828.
Breaking Machine	John C. Wenzell	Jefferson County	January 17, 1828.
Preparing Lint	A. K. Smede	Fayette County	October 11, 1828.
Brake	Reuben Medley	Nelson County	June 11, 1829.
Brake	W. Greathouse	Mason County	July 30, 1831.
Brake	Noah G. Hayden	Mercer County	April 12, 1833.
Brake	Hezekiah Hawley	Jefferson County	June 4, 1833.
Brake	Hezekiah Hawley	Jefferson County	June 29, 1833.
Brake	Robert Miller	Barren County	May 23, 1834.
Spinning Machine	Andrew Caldwell	Fayette County	August 20, 1835.
Brake	J. Pursell	Boyle County	March 18, 1836.
Cradle	W. L. Larimore	Bourbon County	April 25, 1837.
Hackler	P. G. and G. Rice	Boyle County	June 14, 1837.
Brake	Alvin Keyes	Grant County	April 4, 1838.
Hackler	Foster Demasters	Shelby County	November 20, 1838.
Brake	W. N. Stewart	Mason County	February 4, 1843.
Brake	H. Johnson	Mason County	March 4, 1843.
Cradle	G. Reynolds	Mason County	May 30, 1844.
Brake	R. Deering	Jefferson County	June 10, 1845.
Preparation of Lint	R. Deering	Jefferson County	June 25, 1845.
Preparation of Lint	T. H. Barlow	Fayette County	June 25, 1845.
Machine (?)	Jas. Anderson	Jefferson County	November 13, 1849.
Carding Machine	O. S. Leavitt	Mason County	September 24, 1850.
Hackler	J. P. Arnold	Jefferson County	January 4, 1853.
Brake	L. W. Colver	Jefferson County	March 29, 1853.
Brake	O. S. Leavitt	Mason County	August 30, 1853.
Brake	O. S. Leavitt	Mason County	September 20, 1853.
Preparation of Lint	L. C. Suggett	Fayette County	May 23, 1854.
Cordage Machine	J. P. Arnold	Jefferson County	March 24, 1857.
Cordage Machine	J. P. Arnold	Mason County	May 19, 1857.
Harvester	J. B. McCormick	Woodford County	June 2, 1857.
Brake	Conrad Simon	Jefferson County	September 29, 1857.
Preparation of Lint	E. G. Wayman	Jefferson County	February 18, 1862.
Carding Machine (?)	J. Leinweber	Jefferson County	May 1, 1866.
Brake	J. Kaye	Jefferson County	September 15, 1868.
Brake	G. Rynel	Bourbon County	May 3, 1870.
Brake	Theodore Tebow	Fayette County	May 30, 1871.
Bagging Machine	Theodore Tebow	Fayette County	May 30, 1871.
Brake	W. S. Lawrence	Clark County	April 9, 1872.
Harvester	O. Farrar	Jessamine County	May 14, 1872.
Brake	P. S. Fitch	Jessamine County	June 18, 1872.
Harvester	P. S. Fitch	Jessamine County	January 7, 1873.
Brake	J. C. Matherly	Estill County	June 24, 1873 .
Brake	W. S. Lawrence	Clark County	August 5, 1873.
Brake	J. F. Adams	Fayette County	November 4, 1873.
Brake	Thos. Jones	Fayette County	November 21, 1873.
Bleaching Preparation	Sneed and Mount	Franklin County	June 6, 1874.
Brake	Luther E. Burdin	Bourbon County	April 11, 1876.
Hackler	Theodore Tebow	Fayette County	March 17, 1879.
Hackler	Theodore Tebow	Fayette County	October 21, 1880.
Brake	Jos. D. Royse	Adair County	July 1, 1881.
Hackler	Theodore Tebow	Fayette County	March 12, 1883.
Brake (Hand)	William Hicks	Boyle County	August 27, 1888.
Brake	J. D. & J. H. Shely	Fayette County	March 14, 1890.
Brake	W. H. Huggeridge	Campbell County	August 27, 1891.
Brake	Richard S. Webb	Fayette County	March 20, 1895.
Brake	Shely Brothers	Fayette County	1903 (?)

APPENDIX 3.

Examination of 36 Typical Hemp Crops in 1903

GROWN BY	Where Grown	Underlying Rock.	Sowed	On	Pounds Dry Crop.	Pounds Dry Lint.	Pounds Dry Stalk.	Pounds Soluble Matter.	Previous cropping since blue grass.
W. E. Risque	Lexington, 5 miles N x E	Lexington L. S.	3 pecks		5421	925.7	3570	925.7	Three crops tobacco.
Wilkerson Bros.	Lexington, 8 miles N x E	Lexington L. S.	3 pecks	May 10	8816	1410.5	6171	1234.3	One crop hemp.
T. S. Johnson	Lexington, 9 miles N x E	Lexington L. S.	4 pecks	April 14	11461		8066		One crop tobacco, one wheat, one timothy.
F. B. Latham	Lexington, 5 miles N x W	Lexington L. S.	3.5 pecks	April 25	7890	1080	5311	1498.7	Two crops tobacco, one wheat, one clover.
A. K. Latham	Lexington, 3 miles N x W	Lower Cincinnati.	pecks	April 25	7449	1102	5355	991.8	Two crops tobacco.
H. W. Alexander	Paris, 10 miles S W	Lexington (?)			6854	913.8	4772	1167.9	None.
McGrady Bros.	Lexington, 7 miles E x N	Lexington.	pecks	May 15	9675	1168	7273	1234	Three crops tobacco.
W. T. Muir	Lexington, 6 miles E	Lower Cincinnati.	4 pecks	April 20	12606	1234	10176	1196	One crop tobacco, one hemp.
Ed. Bush	Lexington, 4 miles E	Lower Cincinnati.	4 pecks	April 15	7603	793.4	5091	1719	Eight crops hemp, one corn, one wheat.
J. S. Hifner	Georgetown, 5 miles S x W	Lower Cincinnati (?)	3 pecks	May 1	8385	1124	5708	1553	Two crops tobacco, one hemp, one timothy.
Patrick Dolan	Georgetown, 7 miles S W	Lexington.	3 pecks	May 5	7074	925.7	5333	815.5	Old ground restored by clover.
Wood Bros.	Frankfort, 8 miles E	Lexington.	4.5 pecks	April 21	6545	771.4	3945	1829.3	Two crops hemp, one wheat, one clover.
J. P. Hostetter	Frankfort, 6 miles S W	Middle Cincinnati.	4 pecks	June 1	4849	617	2887	1344.5	None.
Henry Moxley	Shelbyville 2 miles S	Upper Cincinnati.	4 pecks	May 1	7119	991.8	5245	881.6	Several crops hemp and restored with clover.
Geo. F. Keene	Shelbyville 2 miles S W	Upper Cincinnati.			8759	1057.9	6259	1442.6	One crop hemp.
Jas. Guthrie	Shelbyville, 1 mile N	Upper Cincinnati.	4 pecks	April 15	8992	1102	5708	2182	Old ground restored with clover.
John Clay	Par,s, 11 miles S x E	Lower Cincinnati.	4 pecks	April 28	13334	2336	9521	1476.7	
Andrew Hampton	Winchester, 1 mile S W	Lower Cincinnati.	4 pecks	April 17	9697	1564.8	6964	1168	Six crops timothy, and corn and wheat.
Jas. Clay	Paris, 3 miles S	Lower Cincinnati.			11637	2049.7	8441	1146	
Tapp Bros.	Winchester, 2 miles E	Lower Cincinnati.	4 pecks	April 15	9918	2182	6744	992	Three crops hemp.
Jas. Crumby	Cynthiana, 9 miles S W	Lower Cincinnati.	4 pecks	April 15	9102	1432.6	6612	1057.9	Old ground restored by clover.
Chas. Estis	Paris, 8 miles N W	Lower Cincinnati.			8265	1476.7	5884	903.6	
Chas. B. May	Paris, 8 miles W	Lower Cincinnati.	4 pecks	April 25	9631	1344.4	7030	1256	Five crops tobacco, 2 clover, 1 corn, 1 wheat, 2 hemp.
P. P. Johnston	Lexington, 5 miles E	Lower Cincinnati.	4 pecks	April 20	9256	1608.9	5995	1652.9	Old ground restored by clover.
H. F. Rodgers	Versailles, 8 miles N	Lexington.			8154	1080	5289	1785.3	
Carter Moore	Georgetown, 3 miles N	Lexington.			9102	1278	6193	1631	
F. P. Drake	Lexington, 5.5 miles N x W	Lower Cincinnati.	3 pecks	May 5	10006	1542.8	7449	1013.8	Three crops tobacco, one wheat, one clover.
S. C. Nuckols	Versailles, 1.5 miles W x S	Lexington.	4 pecks	May 5	7273	969.7	5157	1146	Two crops tobacco, one hemp.
Joe S. Minary	Versailles, 5 miles S	Lexington.	4 pecks	May 10	9477	1102			Old ground restored by clover.
Thos. W. Scott	Versailles, 11 miles N W	Lexington (?)	4 pecks	April 10	7581	837.5	5025	1619	Three crops tobacco, one wheat, one clover, two hemp.
Crutcher Bros.	Versailles, 6.5 miles W	Lexington.	4 pecks	April 27	7493	1344.4	5289	859.6	Five crops tobacco, one wheat, one clover, two hemp.
Jas. Guthrie	Shelbyville, 1 mile N	Upper Cincinnati.	4 pecks	March 31	9565	1432.6	6898	1234	Old ground restored by clover.
J. R. Calloway	Shelbyville, 9 miles N	Upper Cincinnati.	3 pecks	April 25	7560	639	6259	661	None.
J. R. Calloway	Shelbyville, 9 miles N	Upper Cincinnati.	3 pecks	April 25	6149	859.5	4870	418.7	Old ground restored by clover.
G. H. Bonta	Shelbyville, 3 miles N E	Upper Cincinnati.	3.5 pecks	April 20	9257	1234	6634	1388.5	
John Steele	Nicholasville, 5 miles N W	Lexington.	2.7 pecks	May 10	8816	1190	5928	1697	None.

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CENSUS OF 1900

Counties	Acres	Pounds	$worth
Fayette	4927	2491620	157497
Jessamine	2117	1562490	70145
Woodford	2065	1240510	63454
Garrard	1412	892760	42396
Clark	1130	859420	35137
Boyle	915	687100	28145
Bourbon	814	578110	24153
Shelby	278	291780	13606
Scott	477	266960	11876
Mercer	165	129700	5585
Franklin	175	105280	4689
Lincoln	139	85980	4135
Montgomery	42	61000	4040
Harrison	37	31700	1680
Madison	42	16130	755
Trimble	2	3000	160
Kentucky	14107	10303460	468454
California	500	620000	45000
All others	1453	827170	32884

1890

Counties	Tons
Fayette	2773
Woodford	1379
Clark	1354
Jessamine	1341
Boyle	856
Scott	795
Garrard	681
Mercer	522
Shelby	512
Bourbon	311
Madison	58
Lincoln	55
Harrison	49
Franklin	48
Bath	31
Montgomery	19
Oldham	5
Fleming	5
Kentucky	10784
Illinois	256
All others	171

1880

Counties	Tons
Fayette	1151
Woodford	1032
Jessamine	1026
Shelby	319
Scott	315
Bourbon	243
Garrard	143
Clark	138
Franklin	72
Owen	31
Mercer	24
Harrison	22
Madison	21
Boyle	16
Oldham	16
Mason	12
Washington	2
Kentucky	4582
Missouri	209
All others	234

1870

Counties	Tons
Fayette	2370
Mason	1105
Jessamine	899
Woodford	849
Anderson	603
Bourbon	569
Scott	338
Franklin	238
Clark	158
Shelby	148
Madison	106
Mercer	64
Boyle	62
Hancock	40
Jefferson	38
Taylor	37
Montgomery	30
Marion	30
Breckinridge	30
Garrard	18
Fleming	10
Washington	9
Bath	8
Oldham	8
Letcher	5
Nicholas	4
Lincoln	2
Bracken	2
Kentucky	7777
Missouri	2816
All others	2153

1860

Counties	Total Tons	Dew Rotted Tons	Water Rotted Tons	Otherwise Treated Tons
Garrard	28436	24871	1530	2035
Montgomery	2276	1601		675
Fayette	1510	1504	6	
Woodford	1206	1203	2	1
Bourbon	846	836	10	
Jessamine	579	579		
Clark	558	558		
Boyle	511	311		200
Barren	470			470
Oldham	402	400	2	
Mason	283	283		
Shelby	247	236		11
Scott	245	235	10	
Adair	214		9	205
Lincoln	206	201	5	
Jefferson	204	204		
Christian	150			150
Franklin	128	128		
Henry	105	1		104
Bracken	100			100
Hopkins	100			100
Monroe	100	100		
Casey	87	50	12	25
Allen	73	1		72
Mercer	56	56		
Muhlenberg	55		20	35
Edmonson	50			50
Harlan	40			40
Estill	30			30
Lewis	22	22		
Bath	21	8		13
Breckinridge	20			20
Floyd	20	20		
McLean	15	15		
Boyd	11		11	
Grayson	10		10	
Lawrence	8	3		5
Spencer	6	5	1	
Nicholas	4	4		
Owen	3			3
Meade	2	2		
Kentucky	39409	33039	2026	4344
Missouri	19268	15788	1507	1972
All others	15816	3454	445	10918

1850

Counties	Total Tons	Dew Rotted Tons	Water Rotted Tons	Otherwise Treated Tons
Fayette	2967	2813		54
Woodford	2958	2930		28
Mason	1853	1851		2
Scott	1612	1601		11
Jessamine	1563	1552		11
Bourbon	1202	1138		64
Shelby	1022	976		46
Grayson	930			930
Mercer	470	470		
Fleming	461	460		1
Clark	409	409		
Gallatin	351	311		40
Boyle	307	292		15
Franklin	270	218		52
Harrison	247	231		16
Washington	212	212		
Nicholas	161	149		12
Bath	142	142		
Jefferson	120	120		
Montgomery	106	105		1
Garrard	84	84		
Oldham	175	73		2
Anderson	55	55		
Nelson	54	49		5
Lawrence	30	30		
Daviess	26	6		20
Hart	20			20
Spencer	17	17		
Graves	15	1		14
Madison	6	4		2
Bracken	5	5		
Pendleton	5	5		
Lincoln	4	4		
Henry	4	4		
Breckinridge	3	3		
Casey	3	2		1
Logan	3			3
Meade	3	2		1
Owen	2	2		
Boone	2	2		
Grant	2	1		1
Warren	2	2		
Lewis	1	1		
Hancock	1	1		
Muhlenberg	1	1		
Pike	1	1		
Kentucky	17787	16435	1352	
Missouri	16028	15968	60	
All others	1056	1693	1173	

1840

Counties	Tons (Includes Flax)
Fayette	1312
Scott	1212
Mason	1065
Woodford	1061
Harrison	643
Jessamine	597
Bourbon	337
Shelby	324
Clark	322
Jefferson	312
Fleming	196
Christian	177
Mercer	161
Franklin	148
Hopkins	134
Bracken	130
Simpson	122
Casey	105
Estill	101
Adair	96
Barren	82
Ohio	81
Montgomery	80
Madison	79
Nelson	79
Bath	72
Grayson	70
Clinton	65
Garrard	64
Warren	61
Hickman	60
Monroe	54
Campbell	52
Owen	51
Washington	39
Allen	36
Todd	36
Graves	32
Hardin	32
Greene	26
Anderson	24
Butler	22
Henry	21
Lincoln	20
Greenup	20
Grant	19
Meade	15
Trimble	12
Oldham	11
Spencer	10
Logan	10
Calloway	10
Knox	10
Marion	9
Hart	8
Pulaski	8
Bullitt	8
Gallatin	6
Carter	6
Pike	5
Cumberland	5
Nicholas	4
Breathitt	3
Carroll	3
Laurel	3
Union	3
Lawrence	2
Pendleton	2
Muhlenberg	2
Russell	1
Perry	1
Clay	1
Kentucky	9992
Virginia	25594
Missouri	18010 (Unreliable)
All others	41655 (Unreliable)

1810

Counties	Tons
Bourbon	796
Scott	599
Fayette	595
Mason	581
Mercer	433
Woodford	417
Lincoln	324
Jessamine	265
Montgomery	234
Jefferson	210
Shelby	185
Clark	168
Fleming	120
Nelson	100
Madison	94
Henry	93
Garrard	80
Franklin	60
Campbell	58
Bullitt	56
Casey	53
Harrison	47
Adair	34
Boone	24
Gallatin	24
Nicholas	21
Washington	16
Greenup	16
Pendleton	9
Warren	8
Hardin	6
Estill	5
Christian	5
Greene	5
Floyd	4
Knox	4
Cumberland	3
Wayne	2
Pulaski	1
Kentucky	5755

Yield and Prices of Dew, or Weather-Rotted Hemp in Kentucky in Different Years

Year	Yield in Tons	Price per Ton	Price per cwt.
1790			25 shillings
1791			20 shillings
1794			23 shillings
1796			"generous price"
1797			"highest price"
1798			26 shillings
1804			$ 4
1805			4
1806			4
1809			8
1809			5
1810	5,755	$120	7
1811	11,000		6 (water-rotted)
1815			80
1818	(14,000 tons m'f'd at Lex.)		80
1820			110 and "highest cash price"
1825			4
1826			100 4
1827			100 5
1828			125
1829			.04 per lb.
1835	(short crop)		12
1840	9,992		9
1842	17,000		120
1843	7,000		
1844	22,000		60
1845	18,000		3 and under
1846	14,000		
1847	20,000		
1850	22,000		
1853			**120
1859			112.50
1860	33,039		130
1861			"highest market price"
1866			16
1868			10
1870	7,777		
1872	8,474 (Tax Rept.)		
1873	9,542 (Tax Rept.)		
1875	3,661.5 (Tax Rept.)		
1877	6,140 (Tax Rept.)		
1880	4,582		
1885	3,063 (Tax Rept.)		
1890	10,784		100
1895	4,927 (Tax Rept.)		
1897	2,157 (Tax Rept.)		70
1900	4,600		100
1901	7,000		112
1902	9,000		105

* In long tons.
** at Cincinnati.

The following figures, also, are given in the Reports of the State Board of Equalization, but we consider these returns as worthless:

year.	yield in long tons.
1878	6139.4
1896	4927.1
1899	2087
1903	4749.4

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APPENDIX 5.

CORDAGE

Counties	Mills	Income	Capital	Raw Material	Wages	Other Expenses	Hands	Men	Women	Children	Tons Made	
Fayette	13	$ 189300									960	1810
Mercer	3	47200									260	
Woodford	3	44000									220	
Franklin	2	30400									160	
Jefferson	4	21000									75	
Scott	1	20000									100	
Clark	1	20000									100	
Shelby	2	14000									54	
Ohio		12500										
Mason	2										62	
Nelson	2											
Madison	1											
Kentucky	38	398400									1991	
Massachusetts		1068044									2846	
All others		2776924										
Fayette	12		$ 177480	$ 112500			342	199	8	135		1820
Woodford			11000	17000	$ 2900	$1070	32	20	1	11		
Jessamine	1	9000	5000	4400	600	600	8	6		2		
Franklin	1				1000	1000						
Bourbon	2											
Shelby	1		3100	600	300		6	4	1	1		
Harrison	1	1111	1000	400	340	20	5	3		2		
Mercer		7500	2500							2		
Fayette	21	441300	289360				593					1840
Jefferson	5	170500	183000				165					
Jessamine	14	138701	192472				249					
Woodford	19	138525	74298				166					
Scott	7	127000	83000				148					
Shelby	9	75920	45800				126					
Bourbon	6	56000	34500				96					
Clark	3	33000	28700				82					
Mercer	8	32560	40700				103					
Franklin	4	31000	15500				47					
Mason	4	17500	16200				27					
Harrison	2	16000	11500				33					
Nelson	1	5400	3000				28					
Kenton	2	5300	2700				8					
Anderson	2	1800	1100				7					
Madison	1	1500	1000				5					
Hickman	1	200	300				3					
Todd	2	70					2					
Kentucky	111	1292276	1023130				1888					
Massachusetts	51	852200	555100				672					
All others	226	1934830	887347				1904					
Kentucky	159	2311199	1122746	1576064	353256		2443	2205	238			1850
New York	50	2010850	528640	1454075	257604		1110	876	234			
All others	208	3680844	1690120	2582108	581928		2504	2177	327			
Jefferson	5	825500	231000	671812	53136		198	155	43			1860
Shelby	1	150000	30000	100000	4860		21	20	1			
Fayette	2	104600	35000	74250	7380		37	37				
Campbell	4	93000	28500	71000	12240		65	65				
Kenton	3	34100	6000	19650	8460		33	33				
Scott	1	33600	21000	27000	2760		13	13				
Kentucky	16	1240800	351500	963712	88836		367	323	44			
Massachusetts	30	2069816	717600	1538442	263096		877	725	152			
All others	140	4532723	1869189	3163166	614284		34	1812	422			
Kenton	2	128917	61500	64476	23400		79					1870
Jefferson	4	38120	25800	26200	6450		23					
Campbell	2	11145	1800	5792	2555		18					
Kentucky	9	178182	89100	96468	32105		120	69	3			
Massachusetts	32	2886848	666900	1961410	395273		120	69	3			
All others	160	5914352	2774470	3681730	806894		2590	1006	629			
Kenton	2	182850	57000	121900	41805		103					1880
Campbell	1	90000	15000	52000	10000		30					
Franklin	1	50000	60000	20000	15000		60					
Jefferson	4	26500	5500	15220	5718		21					
Kentucky	9	354750	137900	213120	72923		217	155				
New York	37	5207135	3032100	4110112	632748		2461	939	1017			
All others	119	6930286	3970475									

Returns for 1890 and 1900 are too confused and conflicting to enter in this table.

BAGGING

Counties	Mills	Income	Capital	Raw Material	Wages	Hands	Men	Women	Children	Yards Output	
Fayette	5	$ 98612								281750	1810
Bourbon	2	18000								50000	
Jefferson	1	17333								52000	
Franklin	1	14000								40000	
Mason	1	8000								20000	
Shelby	1	3500								10000	
Kentucky	13	159455								453750	
Fayette	2	95000	$ 15000	$ 8500		82	47				1820
Shelby	1		7500	6000	$ 1500	30	10				
No Census taken.											1840
Given with Cordage.											1850
Fayette	10	317500	246500	224700	38568	231	231				1860
Franklin	2	142000	30000	107000	20700	95	95				
Jefferson	1	82500	15000	34000	6744	37	20	17			
Woodford	5	67100	10250	43800	10168	61	61				
Jessamine	6	62150	5300	38200	12300	76	75	1			
Mercer	2	28200	16000	17800	4992	30	30				
Kentucky	26	699450	323050	465500	93372	530	512	18		5750000	
Missouri	3	371578	170000	314000	43272	225	125	100		3680000	
All others	5	38600	12200	24300	4992	32	24	8		110000	
Fayette	8	856900	276000	533240	182100	655					1870
Franklin	1	702140	400000	402000	86140	390					
Jefferson	1	145000	60000	109060	23000	140					
Jessamine	1	48080	20000	33000	10000	43					
Kentucky	11	1752120	756000	1077300	301240	1228	963	102	133		
Missouri	2	750000	1200000	423100	235000	333	103	116	114		
All others	20	2005544	1202101	1124282	421866	1609	652	645	342		
Jefferson	1	213500	150000	150000	28500	150	35	105	10		1880
Kentucky	1	213500	150000	150000	28500	150	35	105	10		
Missouri	3	867395	370000	545900	195007	386	149	161	76		
All others	23	2430758	1971500	1362117	604252	2773					

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VITA.

BRENT MOORE, the writer of this dissertation, was born near Lexington, Kentucky, November 15th, 1877. He received his preparatory training at Georgetown Academy, afterwards attending Kentucky University, and the University of Tennessee. In September 1899 he entered the State College of Kentucky, and graduated there, receiving the degree of A. B. He studied for the M. A. at Kentucky University, and then entered the Johns Hopkins University, where he studied two years. In 1903 he entered Columbia University, studying under Professors Seligman, Clark, Seager, Moore, Giddings, Burgess and Dunning. The following year he studied at Oxford. He served through the Spanish war, in Porto Rico, which experience served largely to turn his thoughts toward political science. He gratefully acknowledges his indebtedness to the fifty Professors who have shaped his education.